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To
Mrs. Francis M. Black,
in grateful appreciation
of a delightful evening,
during which Mr.
Kaisri Nimmanahaeminda, B.A., M.B.A.,
of Chiengmai, Northern Siam,
was so hospitably entertained.

William J.J. Watson Armstrong,
Siamese Consul-General
in Canada.
June 1st 1939.

SIAM

General and Medical Features

Issued
by
The Executive Committee
of the
Eighth Congress

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Introductory Note

His Majesty's Government hopes that many of the delegates to the Congress of the Far Eastern Association of Tropical Medicine and others will be interested in securing information about Siam not only with regard to medical matters but also of a general nature. Accordingly, two publications have been prepared, one by the Ministry of Commerce and Communications, entitled "Siam: Nature and Industry" dealing with the natural features, resources, etc., and this volume by the Executive Committee of the Congress dealing primarily with medical matters, but including also articles upon the Government, Education, Fine Arts, etc.

The material used for this volume was gathered from many sources: some articles were written especially therefor, others were written some time ago for other purposes and some are compilations from various publications.

At the end of the volume will be found a note giving the names of the various authors and others who have been concerned in preparing this book.

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CHAPTER I

GOVERNMENT AND ADMINISTRATION

The Government of Siam is, in theory, an absolute monarchy. All power resides in the King and is exercised by the King. He is the law giver, the executive, and the judge. All officials are appointed by and are responsible to him and hold office only at his pleasure. He is the commander of the Army and Navy. He raises all taxes and authorises all expenditure. He is not only the source of temporal power, but also the Defender of the Faith and technically the Head of the established Church. He does not control the question of Doctrine or Church discipline; but he does appoint on the recommendation of the Church the Chief Dignitaries.

Government is not an end in itself. Whatever theory may underly a particular government it must be judged by the extent to which the interests of its subjects are advanced and protected. The purposes of government have been briefly stated as follows: "To establish justice, ensure domestic tranquillity, provide for the common defence, promote the general welfare and secure general liberty."

The question that should interest any outsider is how far and by what means the unlimited monarchy of Siam is in fact carrying out the ideal purposes of government.

One most practical test is that of stability.

Unlimited monarchy has existed in Siam from time immemorial. While there have been changes in the Ruling Dynasty the principle has never been questioned. The present Royal Family has ruled without opposition for 150 years and it has secured and still keeps the loyal and voluntary support of the Siamese nation. This support rests not on force but on the free will of the people. This in itself proves that the power of the King, though unlimited in principle, has, in fact, not been exercised in a capricious and

tyrannical manner. Domestic tranquillity cannot be secured in these days unless the Government can establish justice and promote the general welfare. There is no present reason to fear that the stability of the Government will be disturbed by internal dangers, nor is there any immediate prospect or demand for any radical change in the Government in Siam.

The stability of a Government may be threatened from without. No nation can live by itself in these days of world-wide commerce and communication. If therefore a nation cannot meet the obligations which the modern world imposes upon every member of the family of nations, it will, unless possessed of great power, find itself controlled by foreign influence. In particular it must accord the requisite protection for foreign life and property within its domain.

Siam is the only nation in Southern Asia that has maintained its independence. The Siamese call themselves the Thai or in English the Free. It is true some limitations upon complete sovereignty were imposed in the early treaties with foreign powers. In particular, Siam could not levy customs duties in excess of 3 per cent. ad valorem and aliens were exempt from the jurisdiction of the Siamese courts. Special privileges are not freely surrendered by the strong; and these extra-territorial rights and the restriction upon Siam's taxing power were maintained long after the conditions which might have justified them at the start had ceased to exist. America was the first nation that voluntarily surrendered these special rights by a new Treaty of Commerce and Friendship, ratified in 1921. In the five years since, all the old treaties have been revised and Siam has regained practically complete fiscal and jurisdictional sovereignty. This has been accomplished not by force or through fear but solely by her achievements in good government.

Siam is a member of the League of Nations and the World Court. She has taken part in many International Conferences and is a signatory to many International Conventions. She is to-day a full-fledged member of the Society of Nations. Her independence as a nation and her territorial domain are more secure

to-day than ever before in her history. She has achieved this stability even as she has secured her domestic tranquillity, by the capacity of her rulers to accord good government to her people and to aliens within her borders.

How has this result been accomplished with an unlimited despotism? Obviously no King can personally administer a realm in extent equal to that of France and containing over 11 million people. Whatever may be the theory of government, the problems of modern States are, in general, similar and must be dealt with by organised departments or bureaus. Later, a detailed statement of the machinery of Government in Siam will be given. At present only a brief summary along general principles will be attempted. The functions of Government are divided into judicial, executive and legislative.

In theory the King of Siam is the judge and as such he deals out justice to his subjects. In fact this judicial function is delegated to a Ministry of Justice and established courts very similar to those existing elsewhere. Public and civil rights and duties are decided by judges trained as lawyers and according to fixed laws and ordinances. It is therefore neither arbitrary nor personal. The King appoints all judges. In practice the principle of long tenure of office and promotion from the lower to the higher courts quite generally prevails. The law of Siam is largely codified, according to the French or Continental system. In building up a modern system of jurisprudence the Siamese Government has had the aid of trained European advisers. As the number of trained Siamese have increased, the necessity for foreign assistance has diminished and the time is not far distant when the administration of law will be completely in the hands of Siamese officials. The degree of modern justice secured in Siam is clearly indicated by the fact, already stated, that foreign powers have recently surrendered their extra-territorial rights and have submitted the lives and properties of their subjects to the jurisdiction of Siamese law and Siamese courts. The only judicial power directly exercised by the King is that commonly exercised by the chief executive in other lands—the power to pardon.

The executive powers of the King are administered through organised departments headed by responsible Ministers. The powers, duties and functions of the various Ministries are fixed by precedent or by law or Royal Decrees. A mere enumeration of the various departments shows how closely the organised Government of Siam resembles that of the other modern civilised States. They consist of the Ministries of the Interior, for Foreign Affairs, Public Instruction, Finance, Lands and Agriculture, Commerce and Communications, War, Marine, and Justice.

There is no legislature in Siam. However, the King, as law giver and as executive, has the benefit of the advice and counsel of several advisory bodies,—to wit, the Supreme Council of State, the Cabinet Council and the Privy Council.

The Supreme Council of State was created by the present King very soon after his accession to the Throne. It is a small body composed of five high Princes of the Royal Family of great experience in political administration. It meets regularly under the presidency of the King. It is not an executive body but advises the King on all important matters which he refers to it. The members of the Council are greatly respected by the people and the creation of this special body and its work since it was created have given satisfaction throughout the country.

The Cabinet Council was created in 1892 as an Advisory Body to the King. The members are composed of the Ministers of State and of certain high officials of similar rank. The members of the Supreme Council usually sit with the Cabinet. It meets regularly and is presided over by the King.

A Privy Council was created many years ago by King Chulalongkorn. In practice, however, this body had not taken any active part in government. His Majesty the present King revised the old Privy Council Act and created a special Committee of 40 members selected by himself from among the Privy Councillors to act as an Advisory Board. The Committee considers only such matters as His Majesty is pleased to send to it for consideration. However not less than five members of the Committee may request His Majesty to submit for the views of the Commit-

tee any question affecting the welfare of the country which, in their opinion, ought to be considered by the Committee. The new Privy Council Act therefore not only enables His Majesty to secure, if he so desires, a somewhat wider expression of public opinion than can be secured from the Supreme Council and the Cabinet Council alone, but it also provides machinery by which the views of important and leading Siamese citizens may be brought to the attention of His Majesty.

In general, new legislation is considered first by the department directly interested. It is then discussed by the Cabinet and the Supreme Council. The final draft is made by a permanent drafting Commission. The King acts therefore as law giver with the aid of a small but competent body representing the best trained public opinion. While the King is free to disregard the advice of the advisory bodies, in practice their decisions and recommendations have great influence and weight.

While in theory this system of organised Government, which has been mainly created in the last half century, exists at the mere will of the King and may be abolished by him, in fact it resembles a constitution. In the future it may be modified, improved and strengthened but it is unthinkable that it will be destroyed.

Siam has then to-day, in most respects, a modern Government. This Government is stable. It has established justice, ensured domestic tranquillity, provided for the common defence, promoted the general welfare. Being in theory a despotism, does it secure also "the blessings of Liberty"?

Complete religious freedom exists in Siam, nor is there by law or practice any interference with this liberty. The Siamese are Buddhists, and Church and State are one. But the Government places no obstacles in the way of missionaries of other religions in Siam. This is due not only to the wisdom of the Government, but also to the natural tolerance of the people.

Economic liberty also exists in a large degree. All forms of slavery have been abolished; and also forced labour, except in cases of emergency, and imprisonment for debt do not exist in

Siam. Life, liberty, and property are safeguarded, and no man is deprived thereof except under legal procedure. Property may be taken for public purposes, but just compensation must be paid. In general, citizens and aliens alike are free to follow their professions and callings. All lawful enterprises are open on the same terms to all alike.

Political freedom, in the narrow sense of the right to control the policy of the State and to direct administration, does not exist, nor under present conditions is it either desired or desirable. In a broad sense the Government is based upon general public approval and the people of Siam have in fact the kind of Government they desire. One form of suffrage, however, has long existed in Siam. The inhabitants of each muban or village—the smallest unit of local government—elect their local officer or village chief. A group of villages form a Tambon and the village chiefs elect one of the members to serve as chief officer or Kamnan. In the election of village chiefs all the inhabitants over twenty years of age, female as well as male, have the right to vote. The village chiefs and the Kamnan may be removed by the Governor of the Province of which they are a part for certain reasons defined by law or on the request of a majority of those who elected them. Thus both equal suffrage and recall exist in a limited way in Siam.

What part has the Monarchy taken in this advance of Siam from a primitive oriental country to a modern State? These reforms have not been imposed upon reluctant rulers by foreign influence or popular discontent. On the contrary the King and the members of the Royal Family initiated, planned and carried out the changes. Moreover, this progress has taken place within a comparatively short time.

Mongkut, who reigned from 1851 to 1868, was the first King of Siam who realized the need for reform and progress along modern lines. He encouraged commerce and international intercourse and began a reorganisation of the ancient Government.

When King Chulalongkorn, the father of the present King, came to the Throne in 1868, Siam was still in many respects a primitive oriental country, with no fixed system of law, no modern

improvements, no railways, no roads and no public education, no real system of revenue or finance. Slavery was prevalent.

Chulalongkorn was a great statesman and realized fully that Siam could not maintain its independence, nor could its rulers retain their power, unless it adopted a modern standard of Government. The task required courage, wisdom and foresight. He abolished slavery, reformed the financial system, began building railways and roads and other public works, established a system of education, reorganized the courts, and in general, laid the foundations of the present order. All this was accomplished without force and without upheaval or violence.

King Chulalongkorn sent the Royal Princes to Europe to be educated, and also hundreds of other young Siamese were sent abroad. He secured the aid of expert foreign advisers in many departments of the Government. Aside from these foreign officials the advance of Siam has been the work of its own rulers and its own people.

Furthermore the rapid advance in the development of the country both economically and politically has been accomplished without creating a large public debt or the imposition of heavy taxes upon the people. In fact the funded debt of Siam, created by foreign loans for the purpose of building railways, is to-day less than one pound per head of population, and is practically equal to one year's revenue from taxes. Moreover this revenue is not only sufficient for the current expenses of the Government but provides a surplus sufficient to meet new expenditure in the way of public works and the creation of sinking funds or reserved funds sufficient to meet the funded debt when it becomes due. It appears therefore that the Siamese people are lightly taxed and that the State revenues are largely devoted to the public welfare.

In theory, there is always the danger with an unlimited Monarchy that the King may prove unwise and tyrannical and may therefore bring serious injury to public welfare. The Kings of Siam, in recent years, have however realised that the power of the monarchy depends more upon public approval than upon ancient prestige or military power.

The present King has been educated both at home and in Europe. He knows not only his own people but has travelled widely and knows Western civilization. He came to the Throne at a time when serious difficulties faced the nation. The public expenditure was exceeding the revenue, and the national credit was in danger. It was clear that a drastic reduction in expenditure was imperative. This is a most difficult task for any Government. It was done thoroughly and successfully and the national budget was balanced by retrenchment and not by increasing the tax burden. The most drastic cut was in the grants for the Royal Household. The recent revision of the old treaties will enable Siam to raise, by taxation, the money needed to carry out her plans for national improvement.

No Siamese would claim, nor would any intelligent foreigner expect, that the standards of government efficiency are as high as those of Western Nations with a far longer experience and greater resources in men and revenues. Judged as all human accomplishment must be in the light of the difficulties of the task and the time expended, the Siamese nation may look upon its past with pride and it can face the future with hope and confidence. Monarchy in Siam has so far justified itself by its work. It will continue to receive popular support as long as its rulers prove themselves able and desirous of giving the nation good government.

Undoubtedly in time the Siamese people, as a result of education and improved material welfare, will acquire both the desire and the capacity for some measure of self-government. Just what form popular participation in political power will take is difficult to foresee; but it is clear that when the time comes the Monarchy which has so far led in creating both the machinery and the substance of good Government will not prove an obstacle in the way of its inevitable development.

A general survey of the form of the Government in Siam and its development have been set forth in this preliminary statement. In order to give a more detailed idea of the working of the Government a brief account of the more important activities of the administration is now presented.

His Majesty King Prajadhipok.

Ministry of the Interior.

Before 1892 there was no centralised system of administration in Siam. Besides the metropolitan area which was under the Ministry of Local Government, the country was divided into a few score of provinces. These provinces were under three different Ministries, viz., those of the Interior, of War and of Foreign Affairs, while the head of each province was practically independent in matters of administration. There was lack of uniformity in the policies pursued by the four Ministries concerned, and control over the heads of provinces was not all that could be desired.

In 1892 a new system of administration was adopted by King Chulalongkorn, aiming at consolidation and centralisation. Under this system all provinces came under the control of the Ministry of the Interior including such provinces as Chiengmai which were hitherto practically autonomous. Hitherto the heads of the provinces were given no salary. They were allowed a free hand in matters of administration and profits derived therefrom went into their own pocket. This method of payment was abolished and henceforth the administrative officials were given a definite salary and were made accountable for all matters of administration.

Under the new system, apart from the metropolitan area under the Ministry of Local Government, the whole country has been divided into 18 (subsequently reduced to 14) administrative parts or circles, each circle (or Monthon as it is called in Siamese) being placed under a Lord Lieutenant. Each circle was then divided into several provinces (or Changvad), each province has a Governor at its head and is in turn divided into districts (or Amphurs). Each district is under a Nai Amphur and is again divided into several communes (or Tambol), each commune having a population of from one to two thousand with a Kamnan at its head. A commune is lastly divided into villages (or Muban) containing about 200 inhabitants or from 10 to 20 families. Each village is under a chief or headman.

The head of a Monthon, the Lord Lieutenant, is appointed for an indefinite period by the King on the advice of the Minister of the Interior. His duty is twofold, that of agent for the Central Government on matters concerning the General Administration of the country, and that of chief Executive officer of the circle for local affairs. He is responsible directly to the Ministry of the Interior and may correspond directly with any other Ministry on affairs concerning them.

The head of a province, the Governor, is directly under the Lord Lieutenant. As chief executive of the province he exercises control over its administrative work and is responsible for the peace and good order of his particular province.

The head of a District, the Nai Amphur, whose appointment rests with the Minister of the Interior, is directly under the Governor. He has administrative duties similar to that of the Governor but limited to his own district.

The head of a commune, the Kamnan, is elected by all Headmen of that commune, while the headman of a village is elected by men and women of above twenty years of age living in that village.

A Kamnan or headman must be a Siamese of over twenty years of age. He has to be the head of a family, and not in active military service. The duty of a Kamnan is to assist the Nai Amphur to keep peace and order and to help the revenue officials to collect the taxes in his commune.

As to the metropolitan area, it was previously under the Ministry of Local Government. In practice, however, it was found that uniformity of administration would be better attained if there were one direct authority over the whole country. Hence the Ministry of Local Government was in time merged in the Ministry of the Interior, and the work of consolidation and centralisation of the country may now be said to be complete.

To ensure peace and good order throughout the Kingdom, a force of gendarmerie was organised under this Ministry and in the course of time a Department of Public Prosecution was created with control over all criminal prosecutions in the Kingdom.

In common with all tropical countries one of the most important questions to be solved in Siam is that of public health. In order to cope with the work involved a Department of Public Health was established, having charge of all sanitary questions in the country. This Department is well organised and medical experts have been engaged from Europe and America. At present there are qualified doctors stationed in every province throughout the country and hospitals have been set up in the large towns. In the capital alone there are five government hospitals besides a number of Health Centres which give free treatment to the public. Since 1912 the city has also possessed an excellent water supply.

Ministry of Foreign Affairs.

Although the work of organising this Ministry on a modern basis began in 1885, it was in fact not complete till the period of consolidation of the Kingdom in 1892. Intercourse with Foreign Powers had increased and experience in international relations had shown the advisability of obtaining an expert to advise on matters affecting the policy of the Kingdom. The post of Adviser is one of great importance in actual intercourse with Foreign Powers. In order to inspire confidence and to ensure impartiality, it was obviously desirable that the Adviser should not only be a man of undoubted character but should also be of a nationality which would not in itself lay him open to charges of partiality. The first Adviser was a Belgian ex-Minister of State. Subsequently, when a successor had to be appointed, it was felt in view of the special position occupied by the United States of America in the sphere of International politics, that the appointment of an American would remove from the minds of Foreign Governments all apprehension of partiality and at the same time would help Siam to avoid being involved in European controversies. The next Adviser engaged was accordingly an American and his successors have been Americans up to the present day.

The post of Adviser was at first that of General Adviser to the Government and his advice was frequently sought on matters

not directly affecting the Ministry of Foreign Affairs. In course of time, however, the various Ministries engaged competent foreigners to advise them in their own field of work, and the successors of the original "General" Advisers were designated simply "Advisers in Foreign Affairs." They were closely connected with the task of revising the old treaties with Foreign Powers and greatly contributed to the success ultimately obtained.

The old Treaties made with various Powers subsequently proved a great handicap to the Government of Siam. Under them Siam consented to the establishment of Consular Courts in her territory and also bound herself to a customs tariff of 3% ad valorem. These Treaties were made some sixty years ago under conditions which no longer obtain. In practice it was found that the system of extra-territoriality thus set up is capable of seriously affecting the proper administration of justice, and the revenue derived from the 3% tariff is hardly sufficient to meet the demands of modern administration. Hence the Siamese Government, already towards the end of the nineteenth century, began to negotiate with the Treaty Powers for a revision of the Treaties previously concluded. In the meantime the Great War intervened. Siam sided with the Allies and thus the Treaties between her and Germany and Austria-Hungary automatically came to an end. The Great Powers were then approached for a revision of the old Treaties, but it was the United States of America who, on the merit of the case and without asking for anything in return, gave back to Siam, by a Treaty dated 16th December 1920, her complete fiscal and jurisdictional autonomy. This Treaty was in fact one of considerable importance to Siam and has been justly appreciated by all Siamese. It marked the turning point in the history of Siam's negotiations.

The work of revising the Treaties with Foreign Powers was continued with success. Following upon the example set by the United States of America, the other countries in time followed suit. The new Japanese Treaty was signed in 1924, the Treaties with France, Netherlands, Great Britain, Spain, Portugal, Denmark and Sweden in the course of 1925, and those with Italy, Belgium

and Norway in 1926; all of these treaties were ratified by March 1927.

Ministry of Justice.

Previous to 1892 there was no uniform system of administering justice in the Kingdom. The courts then in existence were many in number and did not come under any one authority.

In 1892 this Ministry was created with authority over all the courts in the Kingdom. The sixteen courts then existing in Bangkok were reduced to seven; and Borispah or Police Courts were then established. In the years 1895-1896 there were promulgated the Law of Organisation of Courts, the Law of Evidence, the Law of Criminal Procedure and the Law of Civil Procedure, all of which were based upon Western principles. In order to remedy certain defects discovered in the working of these laws, new Laws of Organisation of Courts and Civil Procedure were promulgated in 1908, the provisions of which are still in force. Meanwhile, in 1897 a Law School had been established, where the principles of western jurisprudence were taught.

By the Law of Organisation of Courts of 1908 the Courts of Justice in Siam come under four heads: the Supreme or Dika Court, the Court of Appeal, Courts of First Instance and Police or Borispah Courts. The Police Courts are stationed in Bangkok and possess jurisdiction only over petty cases. Courts of First Instance are to be found in Bangkok also as well as in the Circles and Provinces. The Circle Courts have full civil and criminal jurisdiction within their respective areas. The jurisdiction of the provincial courts is limited, in civil matters, to cases involving not more than a sum of Tcs. 10,000 (about £900), and in criminal matters to fine of a similar amount and imprisonment not exceeding a term of ten years.

Besides the ordinary Courts of First Instance in Bangkok and the provinces, there exists in Bangkok a Court for Foreign Causes as well as the International Courts which are to be found both in Bangkok and in the provinces. The Court for Foreign Causes possesses certain facilities for the consideration of cases in

which a European subject is involved and for the sake of convenience, cases involving European subjects who are entitled to be tried by any special court, are almost invariably sent to such Court.

The International Court, in fact, is not to be taken in its literal sense. It is simply a special court set up as a result of treaty provisions, and will last only as long as these provisions are still in force.

Appeals from all Courts of the First Instance on points of fact and of law lie to the Court of Appeal, which sits in Bangkok for the whole Kingdom.

Appeals from the Bangkok Court of Appeal go to the Dika Court, which in theory means appeal to the King. In this connection a practice has developed to the effect that this Court will confine itself to considering only points of law raised in the lower Courts. It may be noted that in the new Treaties with Foreign Powers there is a provision that appeals to the Dika Court lie only on points of law.

In addition to the Siamese Courts, as a result of the Treaties with Foreign Powers, Consular Courts were set up with jurisdiction over cases in which a subject of the Treaty Powers are involved. There were then as many Consular Courts as there were Treaty Powers. When the Ministry of Justice was in due course organised on modern lines and Western principles of justice adopted and applied it became evident that the raison d'être of the Consular Courts no longer existed. Negotiations were therefore entered into with Treaty Powers with the object of bringing their subjects under Siamese jurisdiction. But in these negotiations complete jurisdictional autonomy was not granted by any treaty power until 1920.

As to the system of law to be adopted, it was decided that the code system was more suitable to the needs of Siam. Hence a Commission of Codification was set up and in 1908 the Penal Code of Siam was promulgated. This Commission in 1923 was transformed into a Department of Legislative Redaction, which is presided over by the Minister of Justice and is composed of

Siamese and European lawyers. The chief work of this Department is codification of the laws of Siam. Of the Civil and Commercial Code three books have already been issued containing about 1,400 sections; the remaining sections will follow in due course. Drafts of the Code of Procedure (both Civil and Criminal) and of the new Law on Organisation of Courts are in the course of preparation and it is hoped that the work of Codification in Siam will terminate in the near future.

In order to improve the standard of judicial administration, much attention has been given to the qualifications of both Bench and Bar. As Siamese judges are selected from barristers of standing and experience, it follows that the training of a barrister is of great importance. For this purpose the Law School has been recently reorganised. It is under the direction and control of a Council of Legal Education, the President of which is the Minister of Justice.

From the short account above given, it can be seen that although the organisation of this Ministry is quite recent, every endeavour is being made to run it on modern lines. This fact has been recognized by the Treaty Powers, who have consented to place their subjects under Siamese jurisdiction in the new Treaties that have been made. When the remaining Treaties are in due course ratified, all alien subjects in the Kingdom will come under Siamese jurisdiction and uniformity, so desirable in the interests of justice, will then be realized.

Ministry of Public Instruction.

In olden days the Siamese temples were the centres of learning and people sent their sons to receive their education there. The priests taught religion, ethics and literature. In 1871 Government schools were first opened, and in 1887 a Department of Education was created. But it was only in 1892, on the establishment of the present Ministry of Public Instruction, that the work of organising national education really began. It bore the name of Ministry of Education from 1920 to 1926.

Under the present system, national education is divided into

three successive stages: elementary school of 3 years course, secondary school of 8 years course, and university course ranging from 3 to 6 years. Most of the elementary and secondary schools are Government schools. There are also many private elementary schools but very few private secondary schools. Compulsory primary school education is now adopted.

In 1917 the civil service college was reorganised and raised to a status of University, which is called Chulalongkorn University after the great King who had given so much stimulus to the cause of learning. There are several faculties at the University, e. g., those of Political Science or civil service, Medicine, Engineering, Arts and Science.

In order to promote the spirit of discipline and co-operation, the Boy Scout Organisation was founded by King Rama VI. It has a wholesome influence in the national system of education.

Ministry of Finance.

Before the consolidation of the Kingdom in 1892, financial administration in Siam was in fact primitive. There was no proper system of budgetting and practically no audit, whilst abroad Siam's credit simply did not exist.

In order to bring the country into line with modern requirements, a new system of financial administration was adopted. The object in view was twofold: to build up a proper system of national finance and to build up national credit. A number of reforms were therefore introduced, chief of which were the institution of a regular system of budgetting and also of accounts and audit, the separation of the King's personal expenditure from the ordinary expenditure of the State, and various administrative improvements aimed at making the collection of the revenues more efficient. These measures had a rapid effect; within two years the revenue collections (without the imposition of any new taxation) increased by over 30 per cent. and thereafter showed a steady growth. Meanwhile expenditure was carefully kept below revenue, the surpluses thus accruing being used to build up a Treasury Reserve, which grew from Tcs. 7½ millions in

Her Majesty Queen Rambaibarni.

1894 to Tcs. 32 millions by 1901.

The prestige abroad obtained by these reforms enabled Siam, in 1904, to raise a loan of £1 million sterling, equivalent, at the then rate of exchange, to Tcs. 17½ millions. This was followed, at intervals of a few years, by four further loans, amounting in all to an aggregate of about £12½ millions. The proceeds of these loans, added to the accumulated Treasury Reserve, enabled Siam to complete her present railway system, and to commence a series of irrigation projects with the all-important object of stabilising the rice crop upon which the whole prosperity of the country depends.

By the beginning of 1926, a sum of over Tcs. 202 millions had been spent on works of development, viz:—

	Tcs.
Railway Construction	172,435,797
Irrigation Construction	22,709,703
Bangkok Waterworks	4,922,129
Samsen Power Station	2,044,339
	202,111,968

This expenditure was met as follows:—

	Tcs.
From current revenues	28,114,026
From the proceeds of loans and from the Treasury Reserve ...	173,997,942
	202,111,968

The system of financial administration set up in the reign of King Chulalongkorn was strengthened and, as the need arose and opportunity occurred, further improved by King Rama VI. Notable among such improvements were the creation of the Treasury Savings Bank and the promulgation of the Budget Administration Law which gave legal authority to the procedure for the submission, consolidation and sanction of the annual budget of the Kingdom. The system of "farming" the revenues was brought to an end. In particular, it was felt to be no longer consonant with the

new position which Siam had won for herself in the world, for a substantial portion of her revenues to be derived from legalised gambling, and the gambling "farm" was accordingly abolished in 1917.

Similarly as regards opium. The policy followed by the Government in the matter of suppressing the opium habit is described more fully elsewhere. Here, it is sufficient to say that the system of farming the opium revenue was abolished by King Chulalongkorn, the import and distribution being placed under direct Government control; and that subsequently, as the result of stricter measures of control, the revenue from opium, though still substantial, has fallen by nearly a third from that realised seven years ago.

The great strides in prosperity made by Siam in the past 30 years may be gathered from the following figures regarding the national revenues:—

	1896	1926 (budget)
Revenue from taxation	16,501,632	65,073,703
Percentage of total revenue ...	79.93%	69.23%
Revenue from other sources ...	4,142,868	28,926,297
Percentage of total revenue ...	20.07%	30.77%
Total Revenue ...	20,644,500	94,000,000

The large growth of revenue enabled the Government not only to finance the increasing interest charges on the loans raised from time to time for purposes of development, but also to provide for the growth of expenditure caused by the general toning-up of administrative efficiency. During the past few years the annual expenditure exceeded the revenue by some two or three million ticals a year. In view of these successive deficits, the present King decided that special measures were necessary in order to obtain a balanced budget. A comprehensive scheme of retrenchment has accordingly been carried through, the King taking the lead by effecting very considerable reductions in the Royal

expenditure. The result has been that the budget for 1926 has been satisfactorily balanced, without the imposition of any new taxation.

It was not only by the introduction of a proper budgetting system and by careful management of her finances that Siam's credit was established. She was one of the earliest countries to adopt the currency and exchange system known as the Gold Exchange Standard. Previous to 1902, the external value of the tical had fluctuated with the price of silver. By the closing of the mints to the free coinage of silver in the year 1902 the value of the tical was stabilised, first at 17 to the £1, and subsequently in 1908, after some alterations, at 13 to the £1, which rate continued in force for about twelve years. As a result of this system the operations of traders, whether importers or exporters, as also the remittance transactions of the Government, were no longer necessarily a gamble in silver. Trade was thereby greatly facilitated and the prosperity of the country furthered. This system has stood the test of time. It is true that the upheaval caused by the great war produced results which, in Siam as in every other country, were totally unexpected. The system was devised to prevent the tical depreciating with a fall in the value of silver. It could not provide against the enormous appreciation in the value of that metal, which reached its zenith in 1919. In order to prevent the bullion value of the tical being more than its face value (which would have resulted in the whole of the tical currency being melted down or exported) it was necessary to raise the exchange value of the tical by successive stages until it reached the maximum of 10 to the £1 in 1922. The gradual restoration of normal conditions since the war has enabled certain preliminary steps to be taken in the process of re-establishing a permanent ratio between the tical and gold. The present exchange value of the tical is about 11 to the £1.

The success achieved by the currency and exchange policy inaugurated in 1902 may be gauged from the following facts: The currency notes in circulation increased from Tcs. 3½ millions in 1902 to nearly Tcs. 138 millions at the end of 1925. The reserve

against these notes consisted of coin and bullion to the value of Tcs. 55 millions, a Treasury Guarantee of Tcs. 5.2 millions, and foreign investments to the extent of Tcs. 77 millions. In addition to this Reserve there is the Gold Standard Reserve, which was established in 1907 in order to provide a foreign reserve in support of the exchange value of the tical, and which amounted at the end of 1925 to £1,502,800. The position may be summarised by saying that on April 1st, 1926, for every 100 ticals of currency notes in the hands of the public, 79.6 could have been redeemed at once in gold, while, if to this be added the coin and bullion held in the currency Reserve in Siam, more than 100% of the note issued was covered.

Thus, with her currency on a sound basis, a favourable balance of trade, a satisfactory budget and revenues capable of expansion at need, Siam can justly feel that, so far as her financial position is concerned, she can face the future with a considerable measure of confidence.

Opium.

Siam was one of the first countries to recognise the evils inseparable from the use of opium. King Chulalongkorn made clear his own attitude towards the problem and, in the course of a speech from the throne in 1908, spoke seriously of the degradation which every country suffers where the habit of opium smoking persists. He referred to the many obstacles in the way of complete prohibition, such as the difficulty of compelling people already addicted to the use of opium to throw off the habit at once, the great danger of the smuggling of opium from neighbouring countries, and the reduction of State revenues that would have to be faced. Nevertheless, he announced his intention to proceed steadily on the path of gradually restricting the opium habit until suppression had been achieved. Accordingly, the sale of opium was brought under much stricter control, the system of farming the opium revenue was abolished, and Siam has taken an active part in the various International Conferences that have been held from time to time to concert measures for the eradication of the opium habit.

In King Rama VI's reign the sale, possession and use of opium were further controlled by legislation. A Commission was also appointed which, after a careful study of the whole problem, recommended that the most practical means of achieving the complete abolition of opium smoking would be a system of registration, under which all opium smoking would be illegal except by registered smokers; and as new smokers would not be registered after a given date, all smoking would become illegal within a generation.

This recommendation was accepted. The particular time at which the scheme can be introduced, and the rapidity with which restriction can progress, will depend on the overcoming of various administrative difficulties, chief of which is the danger of illicit consumption of opium smuggled from countries where poppy cultivation is still extensive. These problems are now being studied by a permanent Opium Commission appointed by the present King. As regards the loss of revenue involved by a policy of progressive restriction, this, although no small sacrifice to a country in Siam's position, can now, thanks to the satisfactory balancing of the national budget and the recent attainment of fiscal autonomy, be faced with less apprehension than was formerly the case.

Ministry of Lands and Agriculture.

Agriculture and fisheries are the two main industries of Siam; and the chief revenues of the Government as well as private wealth, are from agricultural products. It is natural then that a Ministry of Lands and Agriculture existed for some time previous to the great reform in 1892. To-day the chief Departments are Agriculture, Land Registration, Irrigation, Mines, Forestry, and Fisheries.

Rice is by far the most important agricultural product. It is the chief staple of food and also forms the chief export. Rice requires a great deal of water. A large part of Siam is composed of low plains and river valleys. The rainfall is periodical with some six months of dry season. In order to secure for the chief

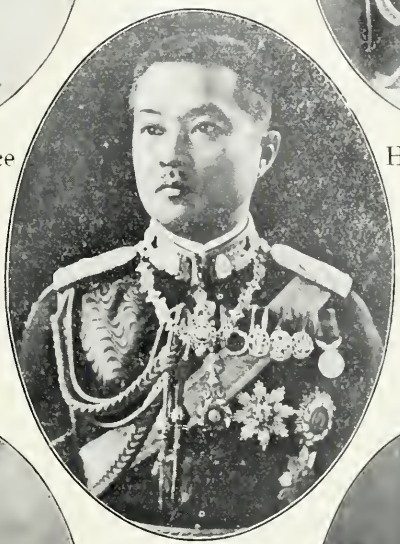
rice-growing districts protection against uncertain weather conditions and to assure sufficient water for the annual crop the Government established the Irrigation Department in 1913. It employed the services of an expert, long trained in India, to study the question of the best method of irrigation for the country. The work of the South Prasak Canal Project was begun in 1916 and completed in 1924 at a cost of 15 million ticals. It consists of headworks on the river, a main take-off canal, two branch canals, and a complete system of major distributaries. The efficiency of the Prasak Project was clearly indicated last year when the rainfall was badly distributed both in time and place, and in consequence the seasonal rise in the river was much below the normal and did not give a satisfactory supply of water to the principal rice-growing districts. The exception was the area commanded by the Prasak Canal where the works were able to raise the river level to the requisite height. Seven other projects are planned.

The system of land registration and recording of all rights in lands is under the Ministry of Lands and Agriculture. Title-deeds, documents of ownership, for each piece of land, were first issued by that Department in 1901. Since then practically all arable lands in the country have been cadastrally surveyed and their owners provided with title-deeds. This has greatly decreased the amount of litigation over titles and boundaries.

The forests of Siam are of great extent and value. Siam, with Burma, furnishes the world's supply of teak. The teak forests were formerly under the control of the Ministry of the Interior until 1923 when they were transferred to the Ministry of Lands and Agriculture. In 1914 the Forest Act extended the duties of the Department to all valuable trees in the Kingdom. The working of all forests is subject to the supervision and control of the Department. The stripping of the forests is prevented by fixing the minimum girth limit. The right of cutting the reserved trees is leased to individuals or companies for a fixed period of from 6 to 15 years. A few forests are worked by the Department itself for the purpose of training officials and ascertaining the cost

H. R. H. Prince
Narisara

H. R. H Prince
Yugala
of Lopburi.



H. R. H. Prince
Paribatra of
Nagor Svarga.

H. R. H. Prince
Damrong.

H. R. H. Prince
Kitiyakara
of Chandaburi.

Members of the Supreme Council of State.

of work in order to levy proper royalties on the lessees.

The Malay Peninsula has been the chief source of tin of the world for many centuries. There are many mines in Siam and large undeveloped deposits. Therefore the Department of Mines was created and experts were engaged to explore and survey the mineral resources. In 1901 the Mining Law was passed creating a uniform system for prospecting licenses and mining leases in place of the former irregular method of grant by special concession.

In 1926 a new Department has been created in the Ministry of Lands and Agriculture—the Department of Fisheries. In Siam both fresh and salt water fish exist in great abundance. They form an important part of the food supply of Siam and considerable quantities are annually exported. The duty of this Department is to preserve the future supply of fish and to control the method of catching them. A former Commissioner of Fisheries of the United States Government is in charge of the Department.

Ministry of Commerce and Communications.

Ten years ago it was felt that the time had come when the problems connected with trade and commerce and with the general economic development of the country had reached a magnitude which necessitated the creation of a separate Ministry of Commerce. This was accordingly constituted in 1920. It was obvious, however, that more than this was needed. Much of the administration of the Ministries of Finance, Agriculture and Communications closely concerns commercial and economic matters. In order, therefore, to ensure effective co-operation and to correlate to a general plan the working of the various Ministries, a Board of Commercial Development, of which the President was the Minister of Commerce, and consisting of the heads and other representatives of the Ministries concerned, was at the same time created. It is a deliberative and consultative body and its aim, put very briefly, is to facilitate the growth of commercial enterprises and, generally, to encourage the development of the natural resources of the country.

As regards the special work of the Ministry of Commerce itself, these included the organisation and supervision of the Co-operative Societies movement (which aims at promoting thrift and co-operation among agriculturists), the registration and control of joint-stock companies domiciled in Siam, the standardisation of weights and measures, and various other activities connected with the country's commerce and its economic development.

An essential factor in Siam's economic progress is the improvement of communications. A description has already been given of the financial reforms whereby Siam was enabled to obtain the capital necessary for carrying out a comprehensive programme of railway construction. The Royal State Railways have now 2,700 kilometres of line open to traffic and 360 kilometres under construction. A network of roads, supplementing and feeding the main lines of railway, is gradually opening up those parts of the country whose products, owing to difficulties of transport, had previously not found a ready market. Similarly, good communications postulate an efficient postal and telegraph service. A Posts and Telegraphs Department organised on modern lines has existed for many years; it is now undergoing a radical re-organisation with the object of increasing the facilities offered to the public.

It is largely owing to such measures that Siam's exports have in recent years shown a remarkable increase, reaching in 1925 a value of about 245 million ticals. During the past five years the average annual balance of trade in favour of Siam has been 53 million ticals, thus leaving a satisfactory margin for the discharge of her foreign obligations, such as the interest on her national debt, payment for railway and other material purchased abroad, &c.

Until 1926, the railways, roads, and the administration of the Posts and Telegraphs, were grouped together under a Ministry of Communications. Its functions, however, in course of time came to over-lap those of the Ministry of Commerce, and there was some duplication of work and personnel. The two Ministries have therefore been recently combined into one Ministry of Commerce and Communications which may now be said to serve the general purpose of a Ministry of Development.

Ministry of War.

The force of national defence consists of the Army, the Air Force, and the Navy. The first two are under the Ministry of War.

Universal liability to military service has been in force for seventeen years. Every able-bodied man at the age of 21 or 22 is liable to be called to military service (a) for two years with the colours: thereafter (b) passing into the first reserve for a period of seven years, during which the reservist is liable to be called upon for a maximum service of two months per year; thereafter (c) passing into the second reserve for ten years, during which the reservist is liable to be called upon for a maximum of 30 days per year, and then (d) passing into the third reserve for six years.

Under the Ministry of War there is a war school for the training of officers, besides special schools for reserved officers and non-commissioned officers. There are also schools for training in musketry, artillery and military engineers, a Military School, a Medical and Veterinary School, an Intendant School, and a General Staff School.

The army is divided into two army corps, numbering in all four divisions.

In 1918 aviation and transport contingents of the Siamese Army were sent to Europe and bore a part in the Great War. Towards the end of 1921 the aviation division began to devote its energies in part to the purposes of civil administration. This branch of the service has now become the Royal Aeronautical Service and serves not only the Army but also other governmental and commercial purposes.

Ministry of Marine.

This Ministry was created in 1910. There is no need for a large navy in Siam and the present fleet of some 30 sea-going vessels is used for coastal defence.

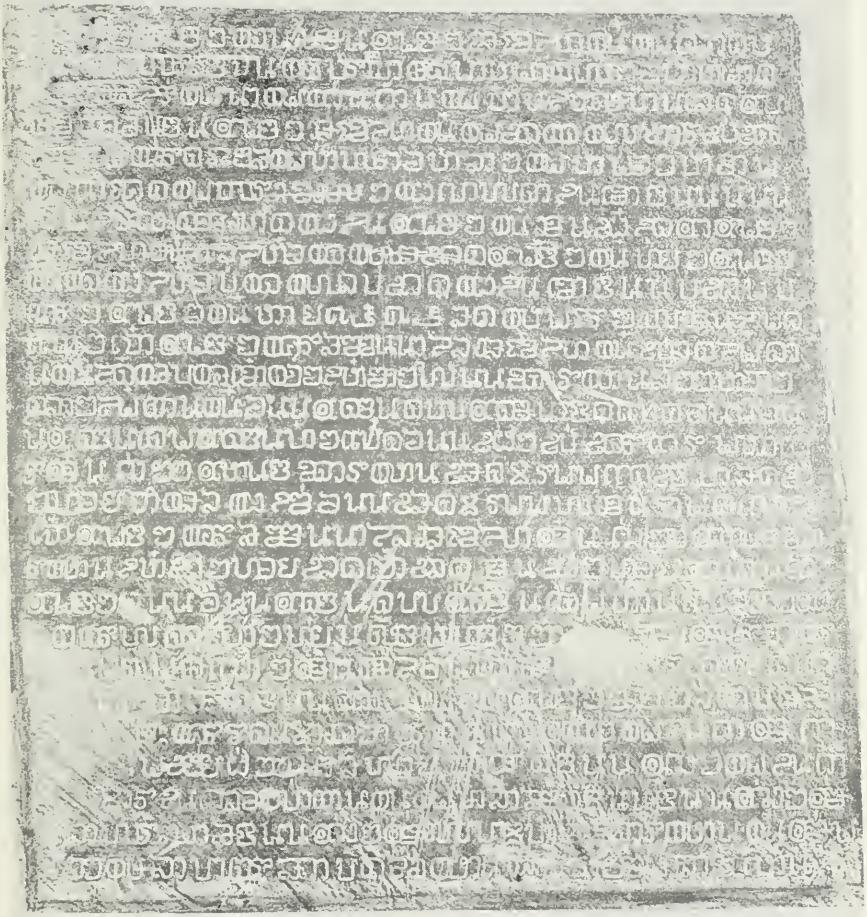
CHAPTER II

HISTORY IN BRIEF

Siam as a political unit is a recent fact in the history of the Indo-Chinese Peninsula, and the history of the Siamese nation begins with the foundation of the Kingdom of Sukhodaya (a ruined city on the upper Menam Yom, one of the rivers forming the Menam Chao Phya). There towards the middle of the XIII century, the Thai, freeing themselves from Khmer suzerainty, founded their first independent principality in the Menam basin.

What is now Siamese territory was in remote times inhabited by Lawas and other savage tribes belonging most probably to the Mon-Khmer family. Some remnants of the Lawa tribes are still in existence in various parts of Siam, and their name can still be traced in the name of *Lavapurī* (Lopburi), which is one of the most ancient sites of Siam. Towards the VII century of the Christian era, three States shared the territory now occupied by Siam; to the East, the basins of the Mun and Mekhong were occupied by the Khmers; to the West, the lower Menam and the Northern part of the Malay Peninsula formed the Kingdom of Dvāravatī, probably inhabited by Mons who had settlements in the Northern Menam valley as far as Lampūn; and to the South, the dependencies or settlements of the Malay Kingdom of S'rīvijaya (Palembang, in Sumatra) occupied both sides of the Malay Peninsula.

The Thai were still in Yunnan, where they had founded the powerful Kingdom of Nan-Chao. They emigrated by and by into the fertile plains watered by the Menam and the Mekhong, but it was not until the middle of the XIII century that they rose to independence. In the North, Mangrai, a descendant of the Princes of Chieng Sen, drove away the Mons from Lampūn and founded the city of Chieng Mai at the end of the XIII century. His contemporary and friend Rāma Khamheng, whose father



อักษรไทย ของพ่อขุนรามคำแหง

ศิลาจารึก พ่อขุนรามคำแหงต้นที่ ๓

พ.ศ. ๑๘๓๕

Inscription of King Rama Kamhaeng [1292 A. D.].

Indrāditya had waged successful wars against the Khmers and established his dynasty at Sukhodaya, conquered the whole Menam valley and the Malay Peninsula as far as Ligor (Nagor Sridharmaraj). This first hero of Siamese history still lives in the memory of the Siamese under the name of Phra Ruang, and his deeds are recorded on a well preserved stone, which visitors can see at Bangkok in the Vajirañāṇa Library.

"The dynasty which reigned during a part of the XIII "and the first half of the XIV centuries at Sukhodaya and "S'rī Sajjanālaya, on the Upper Menam Yom, is the first historical "Siamese dynasty. It has a double claim to this title, both "because its cradle was precisely in the country designated by "foreigners as Siam, and it is this dynasty which, by freeing the "Thai principalities from Cambodian yoke and by gradually "extending its conquests as far as the Malay Peninsula, paved the "way for the formation of the Kingdom of Siam properly so called. "Its role in the history of Indo-Chinese arts and institutions is not "less important than its political role: inheriting as it did the "succession of the Khmer Kingdom, which sank in part beneath "the blows that it administered, it transmitted to the Siam of "Ayudhyā a good number of Cambodian art-forms and institutions "which still subsist in the Siam of to-day." (1)

After one century's brilliance, Sukhodaya was eclipsed by a new dynasty, whose founder Rāmādhipati, a former Prince of U-thong (near Supan), established in 1350 A. D. his capital at Ayudhyā, on an island in the Menam.

The history of Ayudhyā (1350-1767) can be divided into five periods.

The first period, corresponding to the reign of Rāmādhipati I. (1350-1369) and of his four immediate successors, is that of the establishment of Ayudhyā's suzerainty over the neighbouring Thai principalities.

During the second period (1409-1533) the Kingdom of Ayudhyā extended its territory by way of conquest or annexa-

(1) G. Cœdès, *Origins of the Sukhodaya dynasty*, in Journal of the Siam Society, Vol. XIV.

tion, especially in the North under King Paramatrailokanāth (1448-1488).

The third period (1533-1605) is that of the great wars caused by the fact that the conquests of the previous period had brought the kingdom of Ayudhyā into contact with powerful neighbours, especially with the Burmese. The great hero of that period was Phra Naresvara Mahārāja (1590-1605 A. D.). He liberated the country from the Burmese, who had invaded it during the previous reigns, and gave to Siam the most extensive limits she ever reached. The next period covers practically the whole XVII century, and sees Siam entering into relations with foreign nations.

Phra Chao Prāsād Thong (1630-1655 A. D.) founded a new dynasty under which the foreigners and particularly the Europeans began to trade with Siam and to establish factories in the country.

The most famous of all kings of the dynasty was Phra Nārāyana Mahārāja (1656-1688 A. D.), who took as councillor the Greek, Constantin Phaulkon, and exchanged embassies with the King of France, Louis XIV.

The fifth and last period shows the decline of the Kingdom of Ayudhyā.

In 1763 A. D. the Burmese, who had been almost continually at war with Siam since the XV century, invaded the country once more, and after a four years' contest, captured Ayudhyā, which they utterly destroyed in April 1767.

But soon after the Governor of Tāk, a man of Chinese origin, proclaimed himself King of Siam, under the name of Phra Chao Tāk Sin, gathered the remnants of the Siamese army, and succeeded in driving the Burmese away. He established his residence at Thonburi, on the western bank of the river, opposite Bangkok. After a reign of several years, he was seized by religious delusions, and one of his generals, Chao Phya Chakri, on his return from a victorious campaign against Cambodia, proclaimed himself king in 1782 A. D., and established his residence on the Eastern bank of the Menam, on the actual site of Bangkok.

The Kings of the present Chakri dynasty, whose names will

be often mentioned in the notices on the monuments of Bangkok have been:

Phra Buddha Yōt Fā Chulālok, sometimes styled Rāma I, (1782-1809), who restored Siam to her ancient frontiers, and built the Royal Palace in Bangkok, the Wat Phra Keo and Wat Phra Chetupon.

Phra Buddha Loes Lā Nabhalai, or Rāma II (1809-1824), a son of Rāma I., who erected Wat Arun and Wat Sutat.

Phra Nang Klao, or Rāma III (1824-1851), a son of Rāma II, who completed and restored the temples and other buildings begun under his predecessors: under his reign, modern Siamese art reached its climax.

Phra Chom Klao (Mahā Mongkut), a son of Rāma II, (1851-1868).

Phra Chula Chom Klao (Chulalongkorn), a son of King Mongkut, (1868-1910).

Phra Mongkut Klao (Mahā Vajirāvudh), or Rāma VI, (1910-1925), a son of King Chulalongkorn.

Phra Pok Klao (Prajādhipok), a son of King Chulalongkorn, the present reigning King.

Contact with Other Nations.

At a dinner of the Rotarian Club held at the United Club here on the 7th August, 1925, H. R. H. Prince Damrong was the speaker of the evening, and he chose as his theme the history of this country, particularly as regarded its development through contact with other nations. The following is a summary of a most interesting address which was given to the Press at the time:—

Foreign culture came to Siam from India long before it did from any other country. The Siamese received their religion, art, science and writing originally from India.

It would seem that Indian culture alone predominated throughout the Indo-Chinese peninsula for a long time, but became less important from the XIII century as the power of Islam grew in India. It happened that in the same century the Mongols invaded China, and a large number of Chinese emigrated to Cambodia

and Siam. Subsequently the Emperor of China—the Yuan Dynasty—sent an ambassador to establish friendly relations with Siam, in 1282 A. D., when Sukhodaya was the capital of this country, and from that period Chinese culture began to enter Siam.

Of all European nations, the Portuguese were the first to come to Siam, with the exception of some adventurous travellers. It was in 1511 that they first came to establish friendly relations and obtained permission to trade. Thereafter a large number of Portuguese followed and settled in Ayudhya. About thirty years later, war broke out between Siam and Burma; and about a hundred Portuguese volunteered to serve in the Siamese army. After the war, in which the Siamese army was victorious, the King of Siam rewarded the Portuguese volunteers by giving them land on the west bank of the river below Ayudhya to make their home and to build their church. Thus the first European community and the Christian religion came to settle in Siam in the XVI century.

The Portuguese Government at that period wanted to plant Christianity and Portuguese nationality permanently in all Eastern countries which the Portuguese had conquered or where they had established trading stations. They therefore encouraged the Portuguese to marry the native women and to bring up their descendants as Portuguese and Christians. That is why they are so many people of Portuguese descent still in India, Ceylon, Siam and other countries in the East down to the present time. These descendants of Portuguese continue to follow the Christian religion, but otherwise they have become almost assimilated to the people of the countries in which they live.

When the Portuguese were the only Europeans in Siam, a great war occurred between Siam and Burma, lasting for over 50 years. During that period the Portuguese appear to have brought to the Siamese three things, namely, the art of making firearms, the way to use firearms in warfare, and the adoption of fortifications against firearms. The Siamese succeeded in making such good firearms that they actually sent them as presents to Japan. There is a record that in 1606 the Shogun of Japan

wrote to the King of Siam to thank him for the firearms and to ask for more. Regarding the use of firearms in warfare, the Portuguese were not of use solely to Siam; because they taught the enemy too. But the fortifications, the remains of which are still to be seen at Ayudhya, Svangalok and Sukhodaya, were found very useful. Perhaps there were other things that the Portuguese brought to the Siamese and that we do not know to-day; but the Christian religion did not seem to be generally adopted.

Other European nations began to come to Siam in the XVII century, the Dutch in 1604, and the English in 1612. The Danes came in 1621, but only traded at Merǵui, and did not come up to establish their factory in Ayudhya as did the Dutch and the English. The two latter nations are Protestant, and only came to trade, having nothing to do with religious propaganda. It seems that the Dutch brought the art of shipbuilding, while the English, a good many of whom entered the Siamese Service as navigators of the King's ships, probably taught navigation to the Siamese at that period, the Spaniards too came in the XVII century, but as they backed the Cambodians, who were sometimes at war with Siam, they were not particularly welcomed, and had no permanent establishment here.

During the last part of the XVII century, in 1662, the French first arrived in Siam. The advent of the French in this country was due to the fact that Louis XIV sent a mission of Roman Catholic priests to find out how best to restore the glory of the Church in the East to what it had been when the Portuguese were at the height of their power. That mission travelled by land through Syria, Persia and India. They found that the Moslem power was predominant everywhere, but that in Siam, a Buddhist country, every religion was tolerated. They found also that the various peoples in Eastern countries came to trade or to reside in Siam. Therefore they concluded that Ayudhya would be a most suitable place for religious propaganda. Their plan was to teach the various Eastern nationalities that they found in Siam, and let these peoples, after being converted, convey the Christian faith to

their respective countries far and near, the missionaries to follow them afterwards. King Louis and the Pope approved of the idea and Siam was made the seat of the Bishopric of the Far East. The French mission began their work by giving help to the poor and the sick, and even to prisoners. Their charity and kindness began to be known and liked by the people. Siam at that time was ruled by King Phra Narai who was very liberal and wanted to see his country prosperous and his people happy. Naturally, favouring the good work that had been done by the French missionaries, the King got acquainted with them and gave the land to build their church (the Church of St. Joseph which still remains in Ayudhya) and also assisted them in establishing schools. As it happened that Siam was rather in strained relations with the Dutch at that moment, and the King was rather suspicious of them, the Roman Catholic mission succeeded in establishing friendly relations between King Phra Narai and King Louis. At the same time King Louis was at war with the Dutch in Europe and sent out military officers and engineers to assist King Phra Narai. These French experts helped King Phra Narai to build the palace and fortifications of Lopburi as a second capital to be used in case of war with the maritime powers. The French engineers also built two forts at Bangkok, one of which still remains at the Naval School. The Jesuits came to the Court of Siam at that period, and it was said that they exhibited many European things, including a telescope, to King Phra Narai.

The French must have introduced many things into Siam, but practically all that they did was destined to be destroyed because of a singular misunderstanding. The French mission succeeded in converting Constantin Phaulkon, a Greek by birth, who had been appointed Principal Minister of Siam. This probably led that Mission to believe that they would eventually succeed in converting the King and afterwards the whole Siamese nation. King Louis assisted them willingly in the endeavour, but it resulted in the creation of a strong anti-French and anti-Christian sentiment among the Siamese nobles, with Phra Pejraja at their head. When King Phra Narai died, in 1688, a revolution occurred

and the dynasty was swept away, together with all the friends of France. Phra Pejraja became King, and naturally undid all that had been done by French influence. From that period down to the destruction of Ayudhya by the Burmans in 1767, although the French missionaries and Europeans of other nationalities were allowed to remain in Siam, no culture appears to have been introduced into Siam by them.

With the destruction of Ayudhya, most of the European culture was lost. A few things only survive to this day, and they are the casting of cannons, the using of firearms in warfare, and the use of fortifications. Of the minor things introduced by the Europeans we still have medical ointment used in lieu of surgery, also some medical prescriptions said to have been prescribed for King Phra Narai by European doctors. Curiously enough there still remains the confectionery that the Europeans introduced into Ayudhya, namely sponge-cake, which we call "kanom farang," and also oeuffillet which we call "foi thong."

After the destruction of Ayudhya the Siamese were engaged in the war to regain their independence during the reign of King Phya Tak (15 years) and the wars to preserve that independence in the reign of King Rama I. (another 28 years). This period coincided with that of the great French Revolution and the subsequent Napoleonic war; and thus Siamese relations with the Western nations came to be suspended for 40 years. During this period Siam was trading principally with China, and China was the only country that had political relations with Siam. Chinese influence therefore was the influence predominant in Siam. Next to the Chinese came the Indians, whose merchants still continued trading with this country.

Relations between Siam and the Western nations began to revive during the reign of King Rama II., who ascended the throne in 1809. At that time Siam was threatened with war by both the Burmese and the Annamites. The Siamese Government was preoccupied in the acquisition of arms and ammunition for the defence of the country. Two ships were bought and commissioned by the Government to carry Siamese merchandise to Macao and

Singapore and to bring back arms and ammunition from those ports.

In this connection the Siamese came to adopt the White Elephant as the distinctive emblem of their national flag. The Siamese ships used to fly a red flag, similar to the flag of the ships belonging to Malaya and other Eastern countries. It happened that King Rama II. possessed three white elephants and acquired the Eastern honour of being "Lord of the White Elephant." He ordered the figure of the white elephant within the wheel, which means the Royal Emblem, to be added to the red flag. Subsequently, when the Elephant Flag was adopted for merchant ships, the Royal Emblem (that is the Wheel) was omitted, and only the figure of the White Elephant remained.

In 1818 a Portuguese governor of Macao sent an envoy to Siam asking permission for his nation to trade and to construct ships in Bangkok. The request was readily granted by King Rama II., who promoted the Portuguese agent, Carlo de Silvero, to the rank of Luang Abhaya Vanij and gave the Portuguese the well-situated site of their Legation, which was formerly occupied by an Annamite prince, as the Portuguese factory. At this period the French missionaries, who came back to stay with Portuguese descendants during the reign of King Phya Tak, and the Portuguese were the only Western people settled in Siam. At that time there was not a single Siamese who could speak any European language, except some of Portuguese descent who still possessed a knowledge of their language. The French missionaries were obliged to make themselves understood in Siamese.

Relations with the British were resumed in the year 1822. The British East India Co. wished to extend their trade to Siam, so the Marquis of Hastings, who was then Governor-General, sent Dr. Crawford as envoy to the Court of King Rama II. to propose a treaty of friendship and commerce. It appeared from Crawford's journal that he negotiated the treaty with great difficulty, because nobody here possessed a knowledge of English. Whatever he wanted to say he had to tell his interpreter, who translated into Malay to the Siamese interpreter, who again translated it

into Siamese to the Minister. The answer was received in the same manner. Crawford unfortunately came at a rather bad time, because in the preceding year the Sultan of Kedah, who was then a vizier of Siam, conspired with the Burmese. The Siamese army had consequently been sent to invade and to occupy Kedah. The English, who occupied Penang, did not like this development. Crawford was sent to negotiate the restoration of Kedah to the Sultan as well as to propose the treaty just mentioned, which the Siamese did not like. But the real hitch was this, that, while the Siamese were willing to give every facility to British trade, they wanted the British to supply them with arms and ammunition in return. At the same time the British wanted to enter into friendly relations with the Burmese as well as with the Siamese. Crawford, knowing that the Siamese wanted to possess arms and ammunition to fight the Burmese, asked the Siamese not to use such arms and ammunition supplied by the British against the nation that were in friendly relations with the British, and so the negotiations broke down. But general friendship was established and from that day communications of a friendly nature began between the Governments of Bangkok, Penang and Singapore.

King Rama II. died, and King Rama III. ascended the throne in 1824. In that year there was the first war between the British and the Burmese, in which the Siamese entered into alliance with the former. The British then sent Capt. Henry Burney as an envoy to Bangkok, with the result that the first treaty between Siam and the British East India Company was made in 1825, and all difficulties between the two Governments were adjusted. It is interesting to note that that treaty was made in four languages, namely, Siamese, English, Malay and Portuguese; because neither the English nor the Siamese knew the language of the other. That treaty brought British ships and traders to Siam. The first English trader appears to have been Robert Hunter, who established his factory close to the settlement of the Portuguese descendants near the Church of Santa Cruz. King Rama III. ennobled him with the rank of Luang Vises Banij.

The American missionaries came to Siam in 1818. They originally established stations in China. Having heard in that country that there were large numbers of Chinese settled in Siam, they sent two missionaries here in order to teach Christianity to the Chinese. They came and asked permission of the Government, which was of course readily granted. They at first confined themselves to teaching the Chinese in Sampeng. But not wishing to neglect the Siamese, they began by giving medical help and treatment. The Siamese at that period took the American missionary to be a physician, and consequently call him "moh." The American missionaries are all called "moh" down to this day. When the American missionaries found that they met a friendly reception everywhere, they naturally considered that Siam was another wide field for their work, and they came to establish their stations in Siam.

The American missionaries have introduced many beneficial things into Siam, including the art of printing Siamese letters. The printing plant was not invented by the Americans, but by an Englishman called Capt. (afterwards Col.) Low, who was commissioned by the East India Company to learn Siamese, after the Crawford mission had returned. Low acquired both the speaking and the writing of Siamese. He wrote a book on Siamese grammar for Englishmen to learn Siamese. He had the Siamese characters made into printing type at Calcutta and brought the printing plant to Singapore. When the American missionaries acquired a knowledge of Siamese enough to write a tract, they went down to Singapore to get it printed, and subsequently bought that plant and brought it up to Bangkok in 1836. It was the American missionaries too who introduced vaccination for smallpox into Siam in 1837.

After Bangkok became the capital, the trade between Siam and China was carried on almost exclusively by Chinese junks, some built and owned in Siam and some in China. When the Europeans returned to trade at Bangkok, their ships were so improved and superior to the Chinese junks that the Siamese began to wish to adopt them. At that time a young nobleman called

His Majesty King Mongkut.

Luang Sidhi who became Regent at the beginning of the reign of King Chulalongkorn, took a great fancy to shipbuilding. Being a son of a Minister who had authority over the Eastern Provinces, he went down to Chantaboon, where timber was easily procurable, and started a shipyard there, employing foreign shipwrights, I believe both Portuguese and English, to teach shipbuilding. He succeeded and presented the first ship to King Rama III. in 1835. The King was so pleased with the success that he ordered all the Government vessels from that period to be built after the European fashion. At that time the King was restoring a temple, now just north of the Bangkok Dock. He was so convinced that European ships were bound to replace the Chinese junks that he ordered a model of a Chinese junk as a base of a Phra Chedi, saying that posterity who might not know what a Chinese junk looked like would be able to satisfy their curiosity at that temple. The model is still to be seen to this day at Wat Janawa.

But the most important event that influenced Siamese thought about Western culture was the first Chinese war with England, which occurred in 1842. Most Siamese at that time believed the Chinese propaganda, that the Chinese Government only granted the treaty to England as a compromise in order to avoid annoyance. But there were three men who not only believed that the Chinese had been defeated in the war, but were convinced that Western power and influence were to increase in the future in this part of the world. The three men were King Mongkut, who was then a Prince in the priesthood, and his young full brother, Phra Pin Klao, who became Second King in the reign of King Mongkut, and also the Regent whom I have mentioned. These men considered that the Siamese should begin to try and acquire knowledge about the Western peoples so as to be prepared for future eventualities. King Mongkut, who was already renowned as a Pali scholar, and had learned Latin from Bishop Pallegoix, began at once to learn the English language from an American missionary named Mr. Caswell. His brother, Phra Pin Klao, began to learn English too, but being a commander

of the land forces, he preferred to study military art (there is a text-book on artillery translated into Siamese by Phra Pin Klao at that period, still in existence), while the Regent, already fascinated by the art of shipbuilding, continued to study building ships of war and steamers more than a knowledge of the language. Besides the three men already mentioned, there were two other persons. One was Prince Krom Luang Vongsa, the grandfather of Dr. Yai Snidhavongs, who took up the medical profession, and began to learn European medicine from the American missionaries. The other, Nai Mode Amatyakul, who became director of the Mint in the reign of King Mongkut, studied chemistry and machinery. But these two did not acquire a use of foreign languages. The five men I have mentioned were the first pro-Europeans of the period. The Regent went so far as to send a student to England in order to learn navigation. This student succeeded in obtaining a master's certificate and served in the reign of King Mongkut.

In 1850 the British Government sent Sir James Brooke as Envoy to Siam to ask for a revision of the Burney treaty. It was the first occasion that communications were carried on in the English language, because Sir James Brooke came direct from England. King Mongkut had then acquired sufficient knowledge of English to be of great use to his brother, but the negotiations broke down, and King Rama III. then in very poor health, refused any revision. King Mongkut succeeded to the throne in 1851. During his 26 years in the priesthood he not only acquired a knowledge of foreign languages, but through his extensive pilgrimages, he came to possess a first-hand knowledge of the condition of the country and of the people. When he came to the throne he at once discarded the obsolete policy of the former reign, and at the ceremony of his coronation he received foreigners in audience and abolished the custom which hitherto had required the people to close their doors and windows whenever the King passed by. This custom had been copied from China, and King Mongkut allowed all people to approach him and even to present to him personally their grievances. By such acts the King became popular with his own people and with the foreigners.

Early in the reign, the British Government appointed Sir John Bowring, Governor of Hongkong, and empowered him to make a new treaty with Siam. Sir John Bowring came to Siam in 1854, and the treaty was soon concluded. Then followed the treaties with the American, the French, and the other European Governments, and Siamese ambassadors were again sent to Europe after an interval of nearly 200 years.

Sir John Bowring has written a book about Siam in which he referred to King Mongkut as "the rare and illustrious example of a successful devotion of the time and talent of a great Oriental Sovereign to the cultivation of the literature and the study of the philosophy of Western nations." But the fact is King Mongkut was far too advanced for his time, and that fact constituted no small handicap on himself and the few others who were pro-European with him. Few understood his policy, and, when the country was newly opened up to foreign trade, there was much trouble. But the King never turned back or revoked his policy.

Many things and many works of Western origin introduced in King Mongkut's reign still remain to day. He employed Europeans and Americans, some as interpreters and translators, and some as instructors of the army and police forces, which the King began to model in the European fashion. Some were employed as navigators and engineers of the men-of-war and other steamers built during his reign. The use of printing presses, the mint, the substitution of the flat for the old bullet coins, the use of copper and tin cents instead of cowries, the Custom House, the New-road, and buildings of European architecture, began in his reign; and there were many things more. But it is curious that one important thing and one near the King's heart, developed but slowly, viz., the progress made by Siamese in learning European languages. There were large numbers of Europeans settled in Bangkok, and the Government had much to do with the foreigners, yet there were few Siamese who had their children taught foreign languages. I believe this was due to the fact that only the missionaries taught such languages, and the parents were afraid of their children being converted to Christianity. King Mongkut himself had two sons

before he entered the priesthood. Both of them were too old to learn, while his children, born after he came to the throne, were still too young. So the education of the Princes had to wait till 1852, when the elder children of King Mongkut, principally King Chulalongkorn, were of school age. Then he employed an English governess in the person of Mrs. Leonowens to teach them. But she did not remain long, and it was King Chulalongkorn alone who acquired a knowledge of English in his father's time.

King Mongkut died in 1868, and King Chulalongkorn succeeded his father at the age of 16, so it was necessary to have a Regent, of whom I have already spoken. The King was too old to go to school, so it was arranged that he should take a voyage to see for himself the administration of foreign countries. In 1871 he made his first journey to Singapore and Java, and by the end of that year he made another and more extensive voyage to India. No king of Siam had ever left his country before. These two journeys of King Chulalongkorn proved to be of the utmost importance to Siam. As a result of them, two schools were established in the palace; one for teaching English under an Englishman called Paterson, another for teaching Siamese. He ordered all his younger brothers to go to one or other of these schools, and induced the princes and noblemen also to send their sons of school age to these schools. They subsequently served in his Majesty's service and many rose to high and eminent place. I give just one example in the person of the late lamented Prince Devawongse, who had the unique honour to be the first Siamese Minister of State to know European languages.

In 1873 King Chulalongkorn became of age, and before taking up the administration of the Kingdom he caused another coronation ceremony to be performed. In this connection a most impressive thing happened. As you all know, according to old Siamese custom, anyone coming before the King must prostrate himself on the floor. During the beginning of that Coronation ceremony everybody was following that custom in the great Audience Hall. Then the King ascended the throne and put the crown upon his head. At that moment the King proclaimed

His Majesty King Chulalongkorn.

the abolition of this ancient custom. At that instant all the assembly stood up, and I assure you that it was a most impressive and memorable sight. That was the beginning of many reforms, including the abolition of slavery. King Chulalongkorn followed the lead of his father and helped Siam to become prosperous. The advance made can easily be seen from the financial reports. The State revenue was 8 million ticals in 1868, 15 millions in 1892, and 63 million ticals in 1910, the last year of King Chulalongkorn's record reign.

CHAPTER III

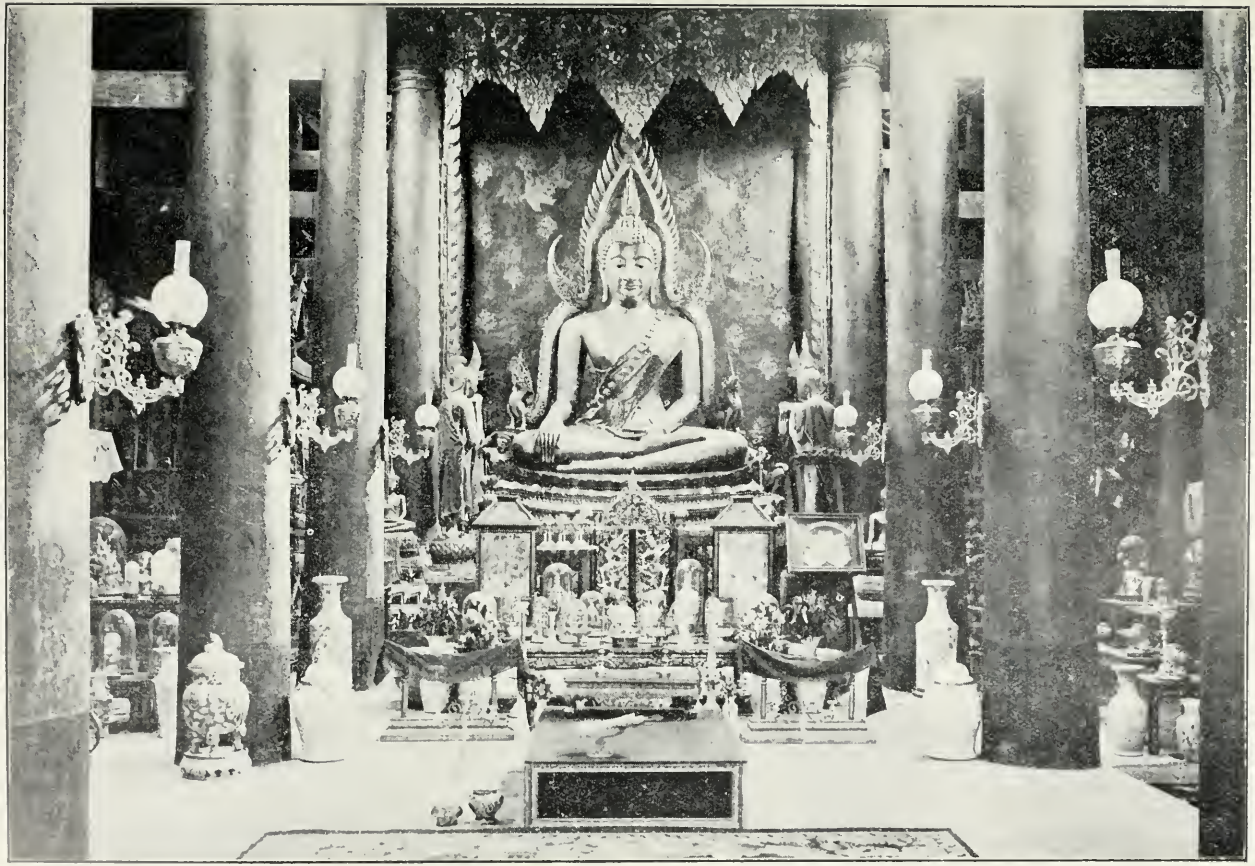
RELIGION

The national Religion of Siam is Buddhism.

The Buddhist religion has its origin in the doctrine taught in India, somewhere about the sixth century before the Christian Era, by a Prince of the S'ākya clan, who had forsaken the worldly life to give himself up to philosophical meditation. It is, in the first place, a way of salvation and a reaction against the omnipotence of the Brahmins. This reform involves two conceptions which are found at the root of the greater part of the Indian doctrines of this period: the belief in transmigration by which every life, be it divine or human or animal, is only reckoned as a phase in a cycle of innumerable regenerations,—and the belief in the virtue of the act (*karman*), by which every good or bad deed is reckoned necessarily to involve an appropriate consequence in either the present or future life. Pushing the Indian pessimism to the extreme, the Buddha, the Sage whose eyes are opened to Omniscience, declares that life with its train of physical and moral suffering, and death as the inevitable end, is thoroughly bad, and that the wise man should extend his efforts in trying to suppress the source of re-birth. Deliverance can only be attained by suppressing every act which automatically involves a consequence, and it is this method of suppression of an act which properly constitutes the doctrine of the Buddha.

Salvation can only be attained outside the world and its mirage, and from the first, the disciples of the Buddha constituted a small brotherhood of begging monks (*bhikshu*), seeking in retirement the way of salvation through meditation and inaction.

Buddhism is distinguished from the greater part of other religions by two essential characteristics. It admits of no rite, no sacrament, no formula conferring the Buddhist quality: laymen who have not been formally ordained are Buddhist by virtue of



Phra Buddha Chinnaraj, Bisnulok.

the single fact that they accept the teaching of the Buddha as being the truth, and they provide for the material maintenance of the community of monks. It is a religion without a god: once delivered, or, to use a technical expression the meaning of which has caused endless discussion, having attained Nirvāṇa, the Buddha is incapable of acting in favour of His faithful, and it is solely the worship of His memory and His relics that constitute the essentials of the Buddhist cult. To the superficial observer, the prayer which the devout Buddhist addresses to the Buddha mentally or before his image, scarcely differs from that which the adept of any other deistic religion addresses to his god. As a fact, it is distinguished in this respect by an essential characteristic. Instead of addressing a prayer, or a thanksgiving, or simply the expression of his love and devotion to an all-powerful and supernatural force, the Buddhist expresses the wish that the merit acquired by him in the accomplishment of some act or other may have, in virtue of the law of the *karman*, the result conforming to his desire. Such, at least, is the state of mind of the learned persons, for it is very evident that to the majority of the people who are still imbued with animist beliefs, such and such a formula or such and such an image is supposed to possess a magic virtue, and that the prayer expressed by means of this or that formula or in front of this or that image, becomes a prayer of direct intercession.

Buddhism in Siam is founded on the existence of a clergy, or rather a brotherhood of monks made up of men who have forsaken the world and have taken to the yellow robe for a more or less lengthy period of time. Ordination does not, in fact, necessitate everlasting vows, and there are few Siamese who have not spent several months at least in the monastery either as a novice (*sāmaṇera*) before reaching the age of twenty, or as a monk (*bhikkhu*) after attaining majority. Externally, the monks or the "bonzes" as the Europeans call them, are distinguished from the rest of the male population by their shaven heads and by their dress, which consists of three main pieces, a skirt, a scarf and a voluminous robe, all three yellow in colour. Besides the great prohibitions

relating to the murder of living creatures, theft, adultery, untruthfulness and drunkenness, the monks should observe absolute chastity, live exclusively from alms, should not take food after midday, should flee from worldly distractions, renounce perfumes and finery, refrain from using any kind of seat or bed above a certain height, abstain from receiving gold or silver, without reckoning a host of other prohibitions relating to the life in common in the monasteries, the non-observance of which constitutes more or less serious sins which involve more or less severe sentences. Such is the theory, at least, but it is certain that the exigencies of modern life have caused the code of monastic discipline to be stretched a few points.

Besides study and meditation, the chief occupations of the monks are the simultaneous recitation of texts taken from the Pāli scriptures, the exposition of the law to the faithful four times a month (on the 8th and 15th days of the waxing, and on the 8th and 15th days of the waning moon), the observance of certain religious and domestic feasts. Twice a month, at new moon and full moon, they gather together in chapter for public confession, when the *pātimokkha*, the cataloguing of sins of commission and of omission, is read.

The monasteries (*Wat*), wrongly called "pagodas" by Europeans, comprise partly a small town formed by the agglomeration of dwellings where the monks live, either alone or with their novices, and partly public buildings, the temple and assembly rooms where the ceremonies of worship take place. In Siam the "bot" (*uposathāgāra*) or enclosure reserved for the assemblies of monks, and surrounded by eight boundary-stones facing the four cardinal and the four collateral points (*sīmā*), is usually distinct from the "vihan" (*vihāra*) or public assembly hall. In spite of its resemblance to the sanctuaries of other religions, the vihan differs from them essentially in the fact that it is not the sacred dwelling-place where the divinity is supposed to reside, but only an assembly room to which the faithful come to venerate the memory of the Buddha and to listen on prescribed days to the exposition of his law. It is a more or less large nave, more

or less richly adorned, having its entrance usually from the east and sheltering on the west one or more statues of the Buddha on an altar. In front of the altar there is a seat on which the monk who is to preach the "sermon," sits. The various buildings around the vihan are salas, schools, sometimes the library where the Pāli manuscripts engraved on palm leaves are kept, and finally, small stūpas or "phra chedi" (*cetiya*) containing usually the bones of deceased persons.

The chief meritorious work of laymen consists in the maintenance of the monks. The cult in proper terms is reduced to the offering of flowers, wax tapers and incense in front of the statue of the Buddha or such other image which evokes the memory of Him, such as the print of His foot (*Phra Bat*), and in the observance of several feasts. The latter are of two kinds: the *saṅghakamma* or acts of assembly of the monks such as ordination, consecration of the boundary-stones defining the consecrated ground—and periodical feasts such as the entry into retirement during the three months of the rainy season and the withdrawal, the distribution of the *Kathina* or clothes for the monks, the feast of the dead, etc.

Besides these ceremonies which take place in the monastery, the monks, following a custom dating back to the time of the Buddha, can accept invitations to go to the homes of laymen to partake of their meals and to preach there, or to sanctify some domestic feast with Pāli recitations. The cutting of the hair after puberty, and also marriage commence regularly with a "suet mon," that is a recitation of *mantras* or formulae of good omen, by a small group of monks. The latter also play an important part in funereal ceremonies.

CHAPTER IV

LITERATURE

When the Thai settlers came into contact with the Khmer inhabitants of this country, a new language was at the same time slowly evolved. The Thai language triumphed at first; but was eventually affected in a profound way by Sanskrit and Pali influences. The result has been that Siamese literature bears in all its phases the imprint of a somewhat complex origin which enabled Siamese writers to obtain those effects of diversity, of contrast, of imaginative strangeness which have played such a dominating part in our literature.

With the famous stele of King Rāma Kamhaeng bearing the date of 1292 and containing the earliest known writing in Siamese, the literary history of this country might be said to begin. The origin of Siamese literature might be traced to India whose culture predominated in the Indo-Chinese Peninsula for a long time. Not only did India exert a potent influence upon the development of Siamese Letters, but she also left us the legacies of her writing, art, and religion, which in course of time have developed into our own.

The introduction of Buddhism into this country gave men new ideals not only in religion but also in literature. Generally speaking, the intellectual life of the Siamese has all along been dominated by religious thought. This being the case, we need not be surprised to find that the earliest works in our national literature were religious.

This sacred literature is mostly in the Pali language. Although it has been translated into the vernacular, it has not appeared in Siamese characters but in Cambodian writing. Consequently, the majority of Cambodian manuscripts had their origin in Siam and not in Cambodia as might be supposed. When the Thai came into contact with the Khmer civilisation and adopted

His Majesty King Rama VI.

the writing of their neighbour, they modified it slightly for vernacular use but kept it intact for copying Pali texts.

Religious works are written on leaves of the corypha palm. In the old days it was the custom for each temple to possess a plantation of these trees in order to provide a ready supply of palm-leaves for making manuscripts.

Siam, like all other Buddhist countries professing the "Little Vehicle" (Hinayana) Buddhism, possesses her version of the Life of the Buddha and also its mass of legends connected therewith. The work Pathomma Somphotiyan is perhaps the Siamese version of the Life of the Buddha best known to the outside world through the English translation of the late Henry Alabaster.

The Story of Phra Malai, a pious Buddhist legend, describes a famous priest who visited Heaven and Hell. This legend which is illustrated with pictures representing the tortures of the damned is written in large-sized books, in which also may be found common religious recitations for use at various ceremonies.

The birth of the Siamese alphabet was due to the ingenuity of King Rama Kamhaeng, who reigned at Sukhodaya for over forty years to about 1317. Various forms of Cambodian alphabets had already been in use in this country; but King Rama Kamhaeng modified the existing characters in order to make them suitable for the writing of Thai words. The inscription of King Rama Kamhaeng exhibits the earliest specimen of Siamese writing. Apart from its historical value, it is also interesting from the literary point of veiw. As an extremely good specimen of balance, assonance, and alliteration, this inscription seems indeed to be the fundamental pattern from which are derived nearly all the metrical forms which occur in Siamese prose.

The earliest manuscript in Siamese known to exist is the Traibhūmikāthā, composed by King Dharmaraja Lü-Tai, son of King Rama Kamhaeng. The work is a treatise on Buddhist Cosmogony, dealing with Heaven, Earth, and Hell according to the conception of his time. This work bears both in style and spirit the imprint of the author's personality.

The ethical literature consisting of old sayings, traditions and

good counsels began to be produced about this period. Amongst many other works, the celebrated "Maxims of Phra Ruang" should be mentioned as being the best work. Another well-known ethical work is the one known as "Rules for the conduct of Kings" translated from the Pali.

Siamese literature sustained an irreparable loss when Ayudhya, Capital of the Kingdom since 1350, was completely destroyed by the Burmese in 1767. In addition to official records and Annals of the Kings of Ayudhya, a large number of manuscripts on religious and literary subjects, products of over four centuries' accumulation, were burnt by the Burmese. Under the circumstances, it is impossible to say what was the total output of the literature of this country during the Ayudhya period.

Looking over the history of Siam during the Ayudhya period we find that Siam was too much occupied in wars to produce any great literature. In spite of this, Siam could still boast of a list of her literary Kings and poets whose works have always been regarded as gems of Siamese literature.

King Trailok, who occupied the throne from 1448 to 1488, was a poet of no mean order, and was author of a celebrated romance in verse entitled Phra Law. The fascination of the book lies in its poetic excellence and the effective manner in which the writer handled his theme.

During the reign of King Ramadhibodi II. who was a great military organizer, a book on military tactics was written in 1518. This work has, however, been long lost, and its exact nature is not known. An anonymous poetical composition known as "Yuen P'ai" is also attributed to this reign. The work is an historical poem in praise of King Trailok on his victory over the Maharaja Tilok of Chiengmai, and has been regarded as one of masterpieces of Siamese poetry.

The reign of King Naresvara (1590-1605) witnessed Siam most busily at war with Burma and Cambodia. Despite these wars, King Naresvara had time to devote to Siamese Letters. According to Sir John Bowring this King is supposed to have caused complete copies to be made of no less than eighty-four thousand

distinct treatises comprising the sacred books.

King Phra Narayana's reign (1656-1688) was perhaps the most prosperous reign of the whole Ayudhyan period. Art and literature flourished throughout this illustrious reign. The King employed a Greek whose name was Constantin Phaulkon as Principal Minister and exchanged embassies with Louis XIV, King of France. The first French missionaries sent by Louis XIV came to this country in 1662 and settled in Ayudhya. Many works on Christianity have been translated from French texts into Siamese, Thomas-à-Kempis' "The Imitation of Christ" being one of them. According to Bowring again King Phra Narayana caused Quintus Curtius to be rendered into Siamese. A poet of no small merit and a great patron of Siamese art and letters, King Phra Narayana was author of many beautiful poems including a portion of Samudragotra.

Works on medicine and the science relating thereto which have always been held in high honour among the Siamese began to put in their appearance about this time. There still exists in the Vajirañāna National Library a treatise on medicine which dates as far back as the reign of King Phra Narayana. Treatises on small-pox usually give a series of demoniac figures which are supposed to preside over the different forms of that disease. The Vajirañāna National Library also possesses an excellent manuscript on the subject.

Siamese literature proper is divided like all other literatures of the world into prose and poetry, and as in almost all others the verse is earlier than the prose.

Poetry is ancient in any literate country. It seems that we Siamese people are gifted with a poetic instinct which explains why we possess such a rich poetical literature both written and unwritten.

The famous poet Sri Praj who lived during the reign of King Phra Narayana was author of several voluminous works which have been considered as first rate poetry. His best known works are Khlong Kamsruen and the Story of Anirudh in verse. His father, the great Phra Maharajagru, also wrote a number of poetical

works, the most important being Samudragotra in verse. In addition to these two poets, the name of Chao Fa Dharmadhibes, a Prince of high rank, should be mentioned as being author of fine poetical compositions such as Kap Haw Khlong Prabhas Dharasok and Nando Banandasutra Kam Luang.

One of the most important books in Siamese poetic literature is Inao, a story based on a remote period of the history of Java, and introduced into this country, on the authority of Prince Damrong, in the early part of the eighteenth century. It is on record that about 200 years ago two daughters of the King then reigning in Ayudhya put the story into Siamese poetry, in a form suitable for the drama. The two sisters, however, did not work in collaboration, for each produced a different version of the story. The two books have different formal titles, but are usually referred to as Inao Yai and Inao Lek. It is not quite clear why expressions indicating "size" should be employed to distinguish one version from the other, but Prince Damrong, in his preface to the latest edition of Inao Lek, suggests that "Yai" is probably used to indicate the work of the elder Princess, and "Lek" that of her younger sister. Inao Lek has always been the more popular of the two, and is the version generally used in the classical drama. It has been regarded as one of the best literary products in the Siamese language on account of its poetic charm and the successful manner in which the story has been handled in verse.

These ancient poets were not so careful as we are to-day about the rules of poetry. The characteristic verse of the Ayudhyan period has been, so to speak, a lawless verse. Their poems belong to a high order of excellence because they are works which have been found to stand the test of time and to possess a power of forming, sustaining and delighting us.

Much of our romances were derived from Indian mythological and historical fables which came to this country direct or through the intermediary of Cambodia. These Indian tales have, however, been adapted in language and details to suit Siamese tastes and ideas. They have proved very popular with the public, and the

most important ones have been adapted for stage-plays. Amongst these may be mentioned the Ramakien taken from the Ramayana, the great Hindu epic; Mahosot, an account of the wars of King Mahosot; Chalawan, a tale of a princess who was carried off by an enamoured crocodile, and rescued by her human lover; Anirudh, adventures of King Anirudh going in pursuit of Queen Ousa; Nang U-Tai, a story depicting the love of a naga princess disguised in human shape and a mortal prince; Manohara, a story of love and romance between a Bird-woman (*i. e.*, a mythological being, half woman, half bird) and a human prince.

The adventures of Anirudh, Phra Samudh, Phra Law, Laksanawongs, and of all the heroes of Siamese romance recall those of the personnages of French romance of chivalry. The marvellous plays a great rôle, and almost at every page a new obstacle arises in order to separate the hero from the heroine; but their happy re-union occurs at the last chapter, and the romance is terminated by this happy ending: They reign gloriously.

Now we come to two important historical works, one called the Memoir of Nang Nopamat and the other, the Evidence given by Khun Luang Ha Wat. It is not exactly known when the Memoir of Nang Nopamat was written. The period treated is, however, Pre-Ayudhyan period. The book, besides being an autobiography, describes the Court ceremonies during each of the twelve months of the year. The Evidence given by Khun Luang Ha Wat gives an account of various reigns of the Ayudhyan period down to the destruction of Ayudhya by the Burmese.

The year 1782 witnessed the foundation of Bangkok by King Phra Buddha Yot Fa Chulalok as Capital of the Kingdom. During this time China began to exert her influence upon Siamese Letters. The Chinese Romance, "The Three Kingdoms," was translated into Siamese for the first time, and became very popular. The style of the Siamese version is very plain and simple. Next came the translation of Liat-Kok which also proved popular. Important episodes of the "Three Kingdoms" have also been adapted for stage-plays. Up to the end of the last reign thirty-four Chinese romances have been rendered into

Siamese.

During the destruction of Ayudhya the Siamese versions of some portion of the Ramayana and of Inao were partly lost. It was King Phra Buddha Yot Fa Chulalok who re-wrote and revised them throughout, and they now form a famous contribution to our national literature. That King also wrote Anirudh in verse.

The Ramakien, Chalawan and Gāvi are titles of three dramatic plays written by King Phra Buddha Loes La. They are of first rate quality and form a famous contribution to dramatic literature. These plays are all pleasant to read on account of their lyrical charm and a remarkable purity and simplicity of style.

During the reigns of King Phra Buddha Yot Fa Chulalok and King Phra Buddha Loes La lived our much admired Sunthorn Bhu, very well-known author of many fine poems and books of proverbs. As a poet he remains unexcelled in his special class of poetry. Genius and an elegant diction he certainly has, and although his writings do not reveal great scholarship they are all pleasant to read, especially his Sebhā Phra Aphai and Sebhā Phra Rajapongsawadan. His proverbs are also full of wise counsels. His poetry places him very high among writers in Siamese literature.

In our dramatic literature we have plays adapted from Indian mythological and historical fables. We also have those adapted from the Chinese and European dramas and some genuine original Siamese plays of great merit and popularity, notably the Khun Chang Khun Phaen and the Krai Thong which are both tales of the latter period in the history of Ayudhya. Of Siamese plays, the story of Khun Chang Khun Phaen is undeniably the best. It has nothing to do with myths and mythological heroes; but depicts real life of the day in which it was written. It is the work which nobody interested in Siamese poetical literature could afford to miss. It shows that the author had a delicate lyrical gift and a remarkable purity of style.

King Phra Nang Klao wrote amongst other things a dramatic play entitled Sangsilpjai which is interesting to read. Dur-

ing this reign lived the Prince Monk who became Supreme Patriarch of his day and who was also a poet of some renown. His contributions to poetry, for instance, Talaing P'ai and Krishna Son Nong, are to be specially noted.

Judging by the Correspondence of King Mongkut one has the impression that he is a very accomplished man-of-letters and master of Siamese prose style. His Proclamations are very good specimens of a plain and direct style.

King Chulalongkorn wrote some very interesting letters. The Klai Ban, letters addressed to one of his daughters while he was on European tours, are interesting to read. He also wrote two plays in verse, one called Nitrachacrit and the other, Kanang. In addition to these he has written a number of works in the form of diaries and essays of travel which give him a prominent place among the stylists of modern prose.

King Rama VI. was a great littérateur. The War of the Polish Succession was written in English while he was at Oxford. It is an extremely good thesis. As a poet and dramatist he belongs to a very high order. His "Nala" taken from the Mahābharata and Kalidasa's "Sakuntala" are interesting to peruse. "Phra Ruang," a play of Siamese origin, was also written by him. He translated three Shakespearian plays, "As You Like It", "The Merchant of Venice" and "Romeo and Juliet," into Siamese verse. His prose style at best which could be seen in his essays and addresses under the pseudonym "Asvabahu" is simple, direct and forceful. His main object in writing is to educate and elevate the national mind.

During the reigns of King Chulalongkorn and King Rama VI. lived the late Supreme Patriarch of the Kingdom, Prince Vajirañāna, whose works containing sermons and other writings of a religious character deserve special merit.

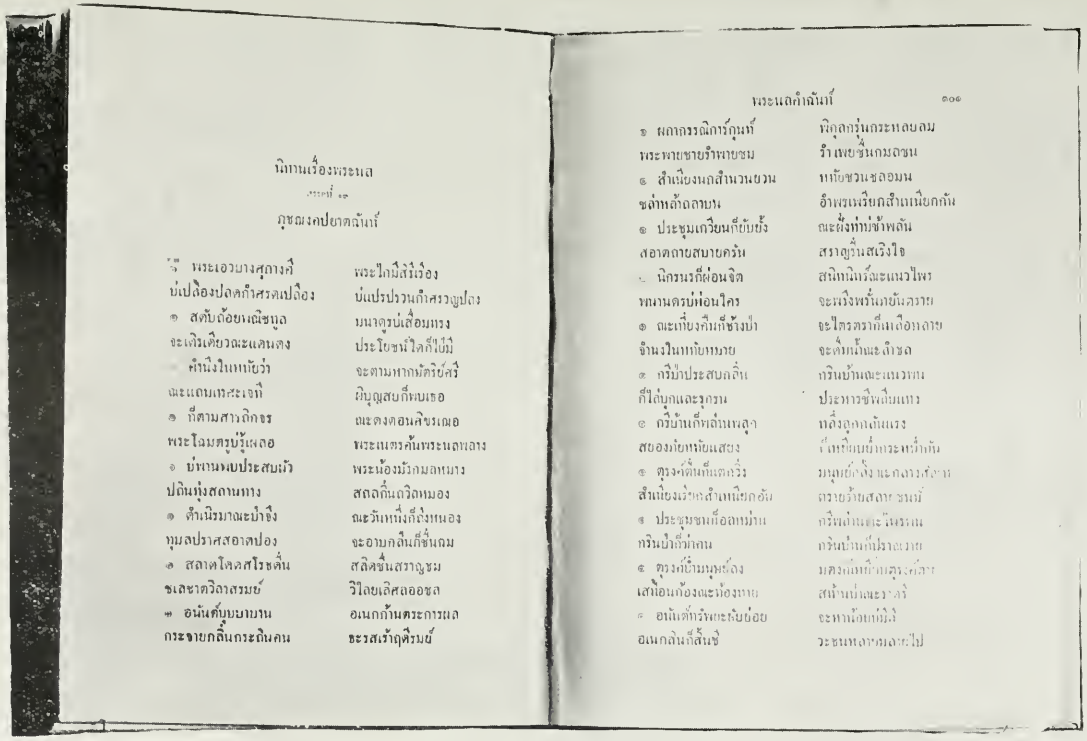
We have seen, in going through the different periods, that our men-of-letters were Members of the Royal Family. Our Kings of the present dynasty and all the Second Kings have each and all contributed something of high merit towards our national literature.

Siam is rich in legal literature. We have Laksana Phra Dharmasastra, Phra Tamra, Phra Tammanun, Phra Raja Kamnot which are ancient works setting forth the laws of the Country in their oldest form, adapted from Dharmaçastra and Laws of Manu. Edicts passed by King Ramadhibodi I and King Trailok have been preserved. Those of the present dynasty form by far the greatest of this branch of national literature.

In history we are unfortunately deficient. With the destruction of Ayudhya Siam was deprived of most of her original sources concerning the history of the country. Compilers of the histories of Siam have to face this same difficulty, namely, the almost entire absence of reliable native chronicles. Although we possess our Annals of the North, Annals of Ayudhya and Books of the Lives of the Four Kings which altogether form the history of this country from early times to the end of King Mongkut's reign, some of the information contained therein is inaccurate. Amongst historical works an able and compendious commentary on the history of Siam compiled by Prince Damrong is to be specially noted.

In contemporary literature we are represented by the works of Prince Damrong who is an authority on historical subjects. Amongst his numerous works we may mention "Our Wars with Burma", "Buddhist Monuments in Siam" and "Treatise on Classical Dancing." In literature we have the works of Prince Bidyalankarana who writes under the pseudonym "N. M. S." "Nala" from the Mahābhārata and "The Golden City" are his two long poems in which one finds real elegance and gaiety. He also writes short stories, essays and fiction. The most popular of all his stories is the "Vetal Stories" re-written from Indian stories. "A Student in England" is also pleasant to peruse. In the poetical works of Kru Deb we find lyrical charm and simplicity of style. Kru Deb has also written two plays, namely, "Mun Wai" and "Mae Sri Krua" and books for the young.

Before the introduction of printing into this country in 1836, literary works were all in the form of manuscript which usually consist of long strips of thick paper about 38 centimeters wide



นิทานเรื่องพระนล

ภุชฌงคปยาตฉันท์

๑ พระเอวบางสุดางศ์ พระไกรีสีเรื่อง
บ่เปลืองปลดกำศรดเปลือง บ่แปรปรวนกำศรวญปลง
๒ สดับถ้อยพจีชนุล บนจุดูรบ่เลื่อมทรง
จะเพิ่มเดียวฉะแสนสง ประโยชน์ใดลีไป่มี
คำนึงในหนัยว่า จะตามหากบัดริษ์ศรี
ฉะแถบเทสะเจที่ ผิบุญสยบก็หมเธอ
๓ ที่ตามสางดิกธร ฉะดงดอนสิขรเณอ
พระโฉมตรูบรู้เผลอ พระเนตรคั้นพระนลหลง
๔ บ่หานพบประสบผัว พระน้องมังกมลหมาง
ปถินทุ่งสถานทาง สถลถิ่นถวิลหมอง
๕ คำนึงมาณะน้ำจิง ฉะรันหนึ่งถึงหนอง
ทุมลปราสสอาสปอง ฉะอบกลิ่นลีชื่นฉม
๖ สลาดโลดสโรชถิ่น สลิลชื่นสรางุชม
ชเลชาตวิลาสรมย์ วิไลยเลิศลออชล
๗ อนันต์บุบผาบาน อเนกถิ่นตระการผล
กระจายกลิ่นกระถินคน ธะรสเร้าฤหิรมย์

๘ ผลากรรณิการ์กุนท์ หิลุลกรุ่นกระหลบลม
พระพายชายรำพายชม รำเพยชื่นกมลชน
๙ สำนึงนลสำนวนยวน หนัยชวนชลอมน
ชลำหล้ถลาบน อำพรเหรียกสำเหนียกกัน
๑๐ ประชุมเวียนก็ยับยั้ง ณะผึ้งท่าข้าพลัน
สอาดกายสบายครัน สราญชื่นสเริงใจ
๑๑ นิกรนรที่ผ่อนจิต สนิทมิตรีสะแนวไพร
พนานครบ่หื่อนใคร จะหวิงพรั่นภยันตราย
๑๒ ณะเที่ยงคืนก็ช้างย่ำ จะไตรตรากินเลื่อมลาย
จำนงในหนัยหมาย จะตื่นน้ำณะสิงขล
๑๓ ครีบ้านประสบลิ่น หรินบ้านณะแนวพน
ดีใส่บุกและรุกรน ประหารชีพลีมแทง
๑๔ ครีบ้านก็หลั่นพลุ่า หลั่งอุดมดันแรง
สยองหนังแสยง ดังเหยียบย่ำกระหน่ำกัน
๑๕ ตรูงดินก็นิดเดียว มนุษย์ดังแมลงสังขาร
สำนึงนรีหลำหนียกลัน ตรายวิบัยสถาพรชนม์
๑๖ ประชุมชนก็อลหม่าน หรินน้ำหนตะโพนรนน
หรินน้ำก็ท่าคน หรินบ้านก็ปราณวาย
๑๗ ตรูงดีบ้านมนุษย์ดัง มลังเมินก็เสมุงเสียง
เสนีอันท้องณะท้องทาย สนั่นบ่นณะราตรี
๑๘ อนันต์ที่รักษะลับย่อย จะหาน้อยหนีไม่
อเนกสันก็สันชี วะชนหลากหมดสูญไป

Modern Siamese Printing.
"Nala," a poem by Prince Bidyalankarana.

which could be folded forwards and backwards into "accordion pleats." This paper which is made from the bark of an indigenous tree called Khoi, in botany known as *Streblus asper or Trophis aspera*, is left white or blackened. On the white one writes with China ink and a pen made from a bamboo splinter, pointed and slip at the tip. On the black writing is done both with steatite or white chalk pencils, or with a bamboo pen as above dipped in a golden yellow ink which is prepared with gamboge, and in certain cases with orpiment diluted in sap from the *Feronia elephantum* tree. [To make the writing more readable the paper is rubbed with a mixture of lamp black. Books made of bark paper are folded like screen and are called Samud. They consist of twelve or twenty-four folds (double sheets) and even more].

The origin of the paper-making industry in Siam certainly goes to a pretty ancient period, and it is probable that it is just to this kind of paper that Barthema alludes when he says of Tenasserim which he visited in 1504 then a Siamese province:—"Their writing is [done] upon paper like ours, and not upon leaves of trees as in Calcutta."

Much of the information concerning the history and culture of this country is only accessible in manuscripts and the Vajirañāna National Library which is the national store-house for manuscripts is therefore especially interesting to research students of Siamese culture and civilisation. It is indeed difficult to over-rate the services which the Royal Institute of Siam is rendering to the literature of the country. Selections from the fresh manuscripts collected by the Institute are edited and distributed from time to time, on such occasions as cremations, birthday celebrations, marriages and New Year's Day. By the Books and Newspaper Law two copies of every book printed in this country have to be deposited at the National Library. The Siamese section of the Vajiravudh National Library of Printed Books now contains over 25,000 volumes.

By publishing works relating to Siam the Royal Institute is doing an invaluable work of propagating the national literature among the public, and in this way the people are awake to a knowledge of their native land. For the promotion of the

literature of this country, His Majesty the King offers a prize for the best original work each year, and this encouragement provokes the desire of writing among the literary circles of this country.

Printing has given impetus to the national literature, and writing as a profession is beginning to be recognised as never before. There is every sign that in literature, as in other directions, Siam is on the threshold of a fateful change.

CHAPTER V

ARCHÆOLOGY

The Archæology of Siam affords special interest to investigators in this branch of science on account of the fact that there has been in the past a variety of civilisations and artistic schools on the territory forming the actual Kingdom of Siam.

The thirteenth century witnessed the unification of Siam into one political unit, which comprised Cambodia and its dependencies, the Môn Kingdom of Haripunjaya, and small states of the Malay Peninsula under the suzerainty more or less direct of Sumatra. All these kingdoms and those which had preceded before the expansion of the Khmer Empire have left archæological vestiges, some of which figure among the most ancient of the Indo-Chinese Peninsula.

The first serious undertaking in the field of Archæology of this country was due to the energy and enterprise of French archæologists, who began to make extensive researches in the ruined cities of Siam about the middle of the nineteenth century. Their investigations and publications threw much light upon the probable conditions of life of the ancient inhabitants of Siam and have done much towards the awakening of interest in this branch of science. The Siamese, save the upper classes, were not very enthusiastic about the Archæology of their country. A real effort on the part of the Siamese Government began when an archæological service whose object it is to preserve the Ancient Monuments of Siam, was instituted by a Royal Proclamation of the 17th January, 1924.

The original inhabitants of Siam long before the dawn of history must have been more or less the same as those of Europe. Flint tools and weapons which are being excavated, show the likeness to those made by primitive races throughout the world. Who were the makers of these flint weapons we do not know.

We learn that later on this country was inhabited by two distinct races whose descendants still survive to this day. In the South lived the curly-headed race of Negrito or Indonesian type. A few of these people are still to be found in the jungles of the Malay Peninsula. In the North of Siam dwelt the Lawas, a totally different race from the southern inhabitants. The descendants of the Lawas still inhabit Northern Siam. They are in fact the Northern Siamese of to-day.

Then there came another race of men known as the Khmers who settled in Southern Siam. Gradually these settlers supplanted the Negrito population. Who these Khmers were we have as yet no clear idea, but we find their direct descendants in the Cambodians and the Môns or Talaings of Pegu to-day.

In pre-historic days the Lawas and the Khmers of this country must have been animists, and belonged to an uncultured and illiterate race. They have left behind them nothing in the form of stone or brick buildings.

Both Siam and Cambodia received the first gleam of civilisation from Indian settlers. It is not known when these Indians came to Siam or Cambodia; but we have no reason to suppose that they reached this country before the Buddhist Era.

King Asoka, when he conquered Kalinga in the South of India, adopted Buddhism as his religion, and became a devout patron of Buddhism. He presided at a great Buddhist Council held at Pataliputta in 307 B.C., and later on we learn that he sent out ten Buddhist monk-missionaries to various parts of the world. It is possible that Buddhism became first known in this country during King Asoka's time.

Brahmanism was also introduced into Siam from very early times, but whether it was before or after the introduction of Buddhism opinions still differ. However, these two great Indian religions continued to exist side by side.

Of the archæological periods prior to 300 B. C. Siam has little evidence to offer. From the latter event onwards, however, remains chiefly of buildings and objects connected with religious worship have been found affording some indication as to the con-

Head and Torso of Bodhisattava from Jaiya.

dition of the inhabitants of this country. Amongst the oldest cities of Siam are Svargalok and Sukhodaya, and near the ruins of these are to be found shrines built of laterite blocks showing similarity in style of architecture to that of the ancient temples of the different parts of India. These shrines, the best known examples of which are those of the Vulture Nest Hill at Svargalok, are certainly the oldest stone buildings in Siam. They were followed by more elaborate Brahmanic shrines and temples of laterite and of sandstone ornamented and decorated with religious symbols and representations of various deities. These in their turn were succeeded by temples and pagodas of the Brahmano-Buddhist style, which found its ultimate expression at Angkor Wat and Angkor Thom, near the great Lake Talé Sap, in Cambodia. Such buildings were not confined to any one part, for their ruins are to be seen on or near the sites of most of the numerous cities which sprang up all over the country. The material used in their construction was apparently that most easily obtainable in the locality where they were built. Thus in Cambodia and Southern Siam sandstone and sometimes blue slate were employed, images and other embellishments being carved in the stone itself. The finest examples of this work in Siam are to be seen in the ruins of Bimai, Moeng Tam, Nang Rong and elsewhere in the plateau East of Korat, in which the beautifully executed sculpture and carvings and the massive proportion of the buildings produce that combination of elegance and weight which is one of the most striking qualities of that style.

In the ancient capitals of Northern Siam, Svargalok, Sukhodaya and Bismulok, huge blocks of laterite were used. In Central Siam where stone of any kind was difficult to obtain, buildings were usually made of brick overlaid with stucco.

The temple at Lopburi known as Phra Prang Sam Yot consisting of three heavy blunt spires is a curious example of mixed material. The main part of the building is composed of laterite blocks to which stucco with its delicate mouldings and tracery still clings in patches, while the apex of each gable, the sides and lintels of the doorways and part of the inner structure are of sand-

stone. The building which belongs to the ninth or tenth century is Cambodian in design and in construction a combination of Siamese and Cambodian styles. The beautiful temple known as Wat Phra Prang at Svargalok and the one at Sukhodaya called Wat Sri Sawai, together with Wat Chinnaraj at Bisnulok are good examples of stucco and laterite buildings. The ruins of brick and stucco "chedi" and "prang" at Phra Pathom, Rajburi, Lopburi and elsewhere in Central Siam are of all ages and some of them are amongst the most ancient relics of man in the country.

About the beginning of the fifth century we find the Great Vehicle (Mahayana) doctrine of Buddhism together with Brahmanism installed in the Malay Peninsula as well as in Cambodia, while the Little Vehicle (Hinayana) reigned in Central Siam which it had reached by way of Burma. The styles of architecture which sprang from Brahmanism and Buddhism were different. With Brahmanism we find the prang or stone tower, developed to its highest expression in the famous Angkor Wat, while with Buddhism, especially in its Hinayana form, the stupa—later the chedi—was the principal mark of distinction.

During the 5th and the 6th centuries we find Siam split up into a number of petty states, one or two lying in the present Siamese part of the Malay Peninsula, of which Nagor Sridharmaraj was the most important; others in Central Siam, including Rajburi, Kanchanaburi, Nagor Pathom and Lopburi, all of which were Buddhist. Those of the Southern part followed the Mahayana canon while those in the Central parts professed the Hinayana doctrine. All these petty states, founded by Indian settlers coming from Southern India, were more or less under the overlordship of Funan, a great Empire embracing Cambodia, Siam and the whole of the Malay Peninsula. Of architectural remains of this period not much is now visible, later generations having added to or transformed the originally simple bell, or bowl-shaped stupas, into more or less elaborate chedis by adorning them with spires or by building new constructions over them so that the original form is now entirely hidden from view, as, for instance, in Nagor Sridharmaraj the famous Maha Thadu and in Nagor Pathom the

giant chedi, Phra Pathom Chedi. The original stupa as discovered in North-West India, where Graeco-Buddhist architecture and art attained their highest development, consisted of a dome-shaped mound of bricks or stone erected on one or several terraces often adorned with sculpture representing the Buddha or remarkable incidents of His life. The stupa was sometimes crowned by a nine-tiered umbrella, the sign of royalty, and surrounded by chapels containing images of the Buddha, preaching halls (Vihāra) and the dwellings of the monks, presenting in reality the prototype of the modern Siamese Wat or temple. We may suppose then that the ancient stupas of Siam were constructed according to designs similar to those prevailing in old Buddhist India. From the 5th to the 7th centuries art flourished in Southern and Central Siam, the style known as the Gupta then dominating. This style has left us many fine stone statues of the Buddha and Buddhist symbols such as the 'Dharmachakr' (the Wheel of the Law), examples of which are especially numerous in Nagor Pathom and Lopburi. A particular manner of honouring the Buddha and his chief disciples appeared also for the first time during that period in the form of votive tablets, either made of burnt clay, or of tin or other metals. These ex-votos, called Phra Phim in Siamese, are generally heart-shaped, and show in high relief effigies of the Buddha either alone or flanked by his two chief disciples, Shariputra and Maudgalyayana, or again worshipped by adoring disciples. Numbers of Phra Phim have been found on the floors of the numerous big caves which intersect many of the solitary limestone hills of Western and Southern Siam. Amongst the most artistic and finely executed are the terra-cotta tablets dug up near the gigantic stupa in Nagor Pathom. Also from the grounds of many of the old temples in North Siam a large number of these Phra Phim have been brought to light.

During the seventh century the Hinayana doctrine spread from Lopburi to Northern Siam, and it was due to a Môn princess from Lopburi that Buddhism obtained a firm footing in the present Circle of Bayab. During the period of Môn dominion there (from

the seventh to the end of the thirteenth centuries) splendid towns such as ancient Haripunjaya (or Lamphun) and Nagor Lampang were built, and adorned with numerous Buddhist temples, with slender and graceful "phra chedi", crowned with the royal gilt umbrella. Ruins of these temples are still to be seen to-day. Several of the sacred buildings near Lamphun show a marked Ceylonese influence, as for instance, the tiered stupa with series of niches containing images of the Buddha of which Wat Kukut is the best example. The material used for all these sacred buildings, whether in the South or in the North, was generally big and well-burnt bricks, stone being rarely used.

Remains of Brahmanic sanctuaries are entirely lacking in Northern Siam, and very rare to the West of the Menam Chao Phya and in the northern part of Siamese Malaya. Evidence of Brahmanic culture have, however, been found on the Western coast of the Malay Peninsula in the present Circle of Bhuket, where fine stone sculptures representing Vishnu and other Brahmanic deities have been found. They probably date as far back as the fifth or sixth century.

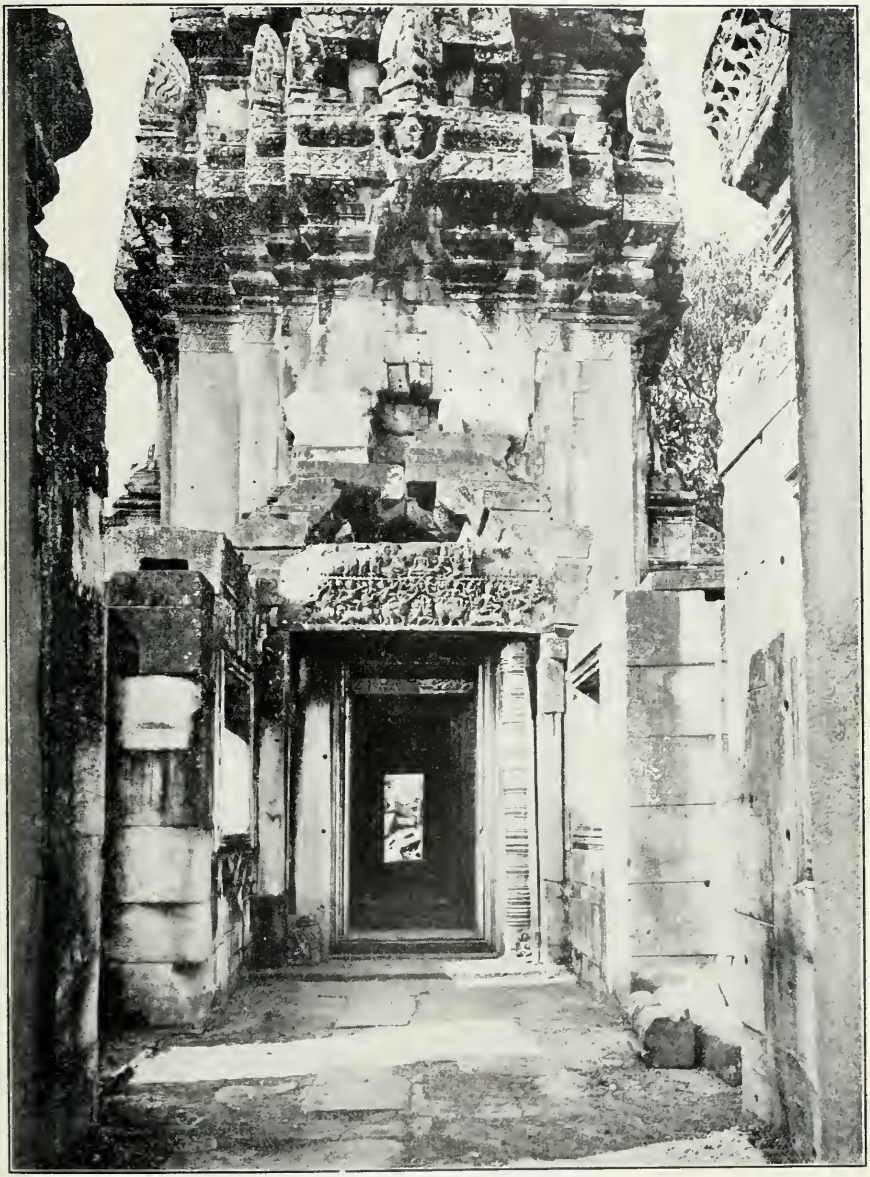
Between the tenth and eleventh centuries Cambodia, having conquered the Empire of Funan, extended its sway over the Menam Valley and down the Malay Peninsula. It tried to bring Northern Siam under its rule also but failed. From this time onwards a number of stone temples dedicated to Brahmanic gods were built, and as already mentioned, the chief architectural form being the tower or prang, beautiful examples of which are to be found on the ancient sites of Sukhodaya, Svargalok, Lopburi as well as in Eastern Siam where there are fine examples, for instance, in the temple city of Bimai, the hill temple of Panom Rung, Panom Wan, Moeng Tam, Surindr and in other places on the North-Eastern plateau. A Cambodian temple usually consists of one or more prang or prasâd, surrounded by walls or galleries. During the ancient periods all construction was done in brick; but later on with the development in architecture all buildings were nearly always of laterite or sandstone, the latter material being very well used for the execution of the wonderful reliefs which adorn many

a lintel and wall in towers or galleries.

A Cambodian tower is generally built in a square, and rises in several tiers up to a dome-shaped superstructure terminating in a lotus-shaped top into which was originally fixed either a flagstaff or the symbol of that particular deity to whose honour it was erected, for instance, a trident if the fane were dedicated to Shiva. There were four doors opening to the four cardinal points. In the central department stood the altar with the image of a god or goddess to whom the temple was dedicated. Lintels and door-frames were always decorated with sculptures representing the various Hindu gods such as Indra sitting on his three-headed elephant, Shiva on his bull Nandin, Narai riding on the Garuda, and so on. The motives were, however, not always taken from the Hindu pantheon; several temples in Eastern Siam were dedicated to the Buddha, as for instance, the splendid temple of Bimai where sculptures representing Mahayanistic forms of Buddha are to be found. Sometimes when the material used was rough or grained laterite, a kind of stucco was used for decorative purposes in which fine moulded reliefs were executed. When the Thai ruled over the Môn and the Khmer during the eleventh and the thirteenth centuries they naturally inherited and took over from them a number of their institutions, beliefs, and styles of art and architecture. A new style of architecture, being the combination of Thai and Cambodian styles was evolved, and found its expression in the numerous temple buildings, prang and chedi built by Kings of the Phra Ruang dynasty in their twin capitals, Svargalok-Sajjanalai and Sukhodaya, and in Kambaeng Bejra. The finest examples of this new style are to be found in the tall and majestic prang at Sajjanalai on the bank of the Me Yom and in Wat Mahathadu at Bismulok, as well as in Wat Chang Lawn both in Svargalok and in Sukhodaya. The religious style of the Phra Ruang era (1238-1350) was further developed during the Ayudhyan period (1350-1767). In Ayudhya there were prang and chedi in plenty, besides remains of former splendid temples such as Wat Sri Sarnbejra. At the beginning, the Thai also employed laterite for building purposes, especially for the construction of columns, but

along the Menam Valley bricks had to be used in place of stone, and so all constructions in Ayudhya were of brick. The houses of the people and even of noblemen and princes were, right up to modern times, made of wood and sometimes with tiled roofs. This being the case, we need not be surprised to find that nothing remained of them. A modern Siamese house made of wood is not a very different thing from its prototype. Palaces made of brick for the use of Kings were however built, and the foundations of such have been found both in Svargalok and in Ayudhya. At Lopburi palaces were built during the reign of King Phra Narayana (1656-1688) by French engineers then in the employment of the King. Many of the old cities, whether of Môn, Cambodian or Thai origin, were strongly fortified. The Cambodian used stone and earth, the Môn and Thai bricks, for the building of city walls which were often provided with monumental gate buildings. Of Ayudhya's strong walls and bastions only remnants now remain, nevertheless they still indicate their rugged strength. The city walls of Sukhodaya, Svargalok, Chiengmai, Lamphun and many other towns in Northern Siam built by the Thai or the Môn are extant as are the brick bastions of Lopburi and the stone walls of Nagor Rajsima, built by French engineers during the reign of King Phra Narayana.

Siam is rich in old inscriptions in Sanskrit, Pali, Khmer, Môn and Thai. Some of the Sanskrit inscriptions are very old and the oldest one dates as far back as the third century. Some have been found in Eastern Siam and in the Malay Peninsula, and one has recently been discovered at Lopburi, possibly of the fifth century. Inscriptions in Pali engraved on clay tablets inscribed with the Buddhist Profession of Faith in Pali of a distinctly Indian style of character known to have been in use in the fifth and sixth centuries, have been found at the famous chedi at Nagor Pathom. Both at Lopburi and Lamphun, Môn inscriptions of dates ranging between the eighth and the ninth centuries have been found. In Eastern Siam, many inscriptions in Cambodian have been discovered at Lopburi, Sukhodaya, Svargalok and Kambaeng Bejra. Of the thirteenth century a Thai inscription



Ruined Sanctuary at Bimai.

containing the earliest specimen of Siamese writing and bearing the date of 1292 has been found at Sukhodaya. It is the famous stele of King Rama Kamhaeng, an unique document of archaeological and historical interest. It relates how this King introduced the Thai alphabet and how he administered his Empire, protecting the Buddhist religion, dispensing justice and promoting the prosperity of his subjects. There are other Thai inscriptions, the contents of which are either religious concerning gifts to the Brahmanic gods or to the Buddha, or a glorification of Cambodian or Thai Kings. The materials used for these inscriptions were either of grey-green limestone of very fine grain or blue slate or reddish or yellowish sandstone which on account of their comparative softness are adaptable for engraving. The majority of images which adorn the Brahmanic and also the Buddhist temples were made of sandstone and in the case of smaller images were made of bronze. Many fine stone or bronze images of the Buddha have been taken from the ruined temples all over the country and are now housed in various temples in Bangkok. The biggest bronze image of a sitting Buddha is still at Ayudhya where it is enthroned inside the crumbling walls of Wat Jaiya Mongkol.

The awakening interest in the archæological treasures of the country has been freshened by the establishment of several museums—besides the National Museum at Bangkok—namely, in Ayudhya, Lopburi, Bismulok, Lamphun and Nagor Sridharmaraj. And as research work advances these museums and more to come will no doubt be filled with treasures in the form of images, inscriptions and artistic objects. Interest in Archæology has been powerfully stimulated by Prince Damrong, President of the Royal Institute for Literature, Archæology and Fine Arts. Siamese Archæology has already proved useful in corroborating theories of scholars as to the origin and racial affinities of former inhabitants of this country, and regarding the important question from time to time and in different localities of Brahmanism and Buddhism. There can be little doubt that many of the mysterious gaps which intervene in the history of the country will be filled in by the effects of this awakening.

CHAPTER VI

FINE ARTS

Siamese artistic crafts cannot be dissociated from the parent art of architecture, and the religious significance of the temples has influenced their decorative details and also the forms and ornamentation of objects used at various ceremonies and in every-day life. Most of the motives of Siamese ornament originate in a combination of religious symbolism and a love of nature, and characteristic Siamese pattern work usually contains mythological beings illustrative of some episode of the Ramayana, and story of the Life of the Buddha.

The ground work is usually filled with a conventional form of design reminiscent of acanthus ornament, but which has a more flame-like and wavy formation known as Kranok. In combination with the mythological creatures this is found used in the ornamentation of gables and other decorated portions of the Wat buildings, either executed in plaster relief or carved in wood, and usually gilded on a ground of brightly-coloured glass mosaic. It also forms the chief motive for ornamentation of silver-ware, pottery, lacquer and other handicrafts. Other forms showing Chinese and Indian influences are also found, but this Kranok design is typical of pure Siamese style.

Painting.

The interior walls of the Wat buildings and cloisters form the canvases of Siamese artists, and it is in these mural paintings that we find the art of tempera painting highly developed. Stories from the Ramayana and other legendary lore, with which Siamese poetry and literature are lavishly endowed, form the subject-matter of these decorations which more often than not cover the whole of the walls from top to bottom. The treatment is very decorative, although somewhat naive, and in many cases is of excellent workmanship.

The most striking feature is the curious use of a sort of bird's eye perspective which enables the artist to lay out whole towns and stretches of the country, on which background the particular story illustrated displays its human interest by multitudes of figures, kings, countries, ordinary people. Tewada or imaginary spirits of the element, various representations of the Buddha during His life and incarnations, real and mythological animals and so on through the whole range of a rich and lively imagination.

The work is executed in flat colours and the drawing obtained by outline. The Tewada and other mythological beings are generally outlined in gold leaf and are often most beautifully drawn in a conventional manner. The whole effect although somewhat confused in composition is rich and decorative to the utmost extent.

Small genre paintings in frames are often hung up in various parts of the Wats and palaces. They represent various stories of popular interest, or episodes from Siamese history, being usually connected with our wars with Burma and religious and State ceremonies.

Intricate borders of typical Siamese design are used to divide the spaces to be decorated into suitable proportions. Overall patterns, a typical example of which is composed of a diapered pattern of Kranok with a Tewada in the central space of each ogee form, are sometimes used instead of the subject pictures. All these ornamental patterns are painted by hand and represent an enormous amount of labour, as the spaces covered are often of great extent.

Sculpture, Modelling and Bronze work.

Modern sculpture is mainly confined to modelling and casting in bronze, and the subject is usually the representation of the Buddha, of which the number in existence is beyond calculation. Examples of these are extant which date from very early times, some were executed in bronze while others were carved in stone. Huge images made of brick and laterite and finished in plaster still exist at Svargalok, Sukhodaya and other places.

Most beautiful fragments of these carved and bronze images are to be found in great numbers on the sites of ancient cities, and many of the best examples are preserved in the National Museum at Bangkok and in private collections. One of the most beautiful images of the Buddha extant is to be seen at the ancient Wat Chinnaraj at Bisnulok.

Our conception of the Buddha follows some distinct rules and conventions, and is therefore unlike that of an ordinary human form. The great majority of the sacred images show the Buddha seated cross-legged; but standing, lying and other postures are also found. Statues of His disciples, hermits and other historical personages are also represented. Ancient figures of Brahmin gods, angels, mythological figures, representations of snakes, birds, elephants, ornamental forms in stucco are to be found in abundance amongst the ruined cities of the country. The more modern work is a continuation of the same ideas and the use of stucco figure and relief ornament is found in all the Wats of Bangkok.

In addition to the use of bronze for casting images of the Buddha, bells and gongs, often of large size, have been made in Siam from remote times. Also bronze cannon often of dragon shape and highly ornamented with relief decorations and many other objects, useful or decorative, are still preserved in the museums and elsewhere.

Wood carving.

The decorated gable ends of the temples are generally of carved teak, and columns, doors, windows and other constructional details are often of richly carved wood.

The main doors of the Bote at Wat Sutat are of teak, carved in high relief with a design containing birds and beasts of the jungle worked in amongst the foliated ornament.

Wood carving is also used for the ornamentation of pieces of Wat furniture such as the abbot's seat and bookcases to hold the sacred manuscripts in the Vajirañana National Library.

Smaller works of more delicate workmanship are not generally met with, and carving is used mainly as a decoration for the Temple buildings.

Ancient lacquer and gilt bookcase.

A certain amount of ivory carving is carried on, mainly in the North, where exquisite examples of carved elephant's tusks have been produced. The handles of old time swords and spears are often of carved and turned ivory, and representations of elephants and other animals are made in this material. Seals, portion of musical instruments and sundry small articles are also made in turned and carved ivory.

Inlaying and gilding.

These crafts are very much in evidence in the decoration of Wats and other Siamese buildings. The carved or stucco ornamentation is generally gilded or painted yellow to represent gold. The background of the gable tympanum and often the Naga forms of the gable framing, are invariably inlaid with glass mosaic. This glass is extremely thin and in addition to being coloured is backed with a metal foil. It is cut into small tessera by the use of ordinary scissors and laid into a background of prepared gums resembling pitch. The surface so treated gains a very rich and glittering appearance, each facet reflecting as a small mirror the intensity of the tropical sunlight.

Great use is also made of a rougher sort of mosaic. This is formed of pieces of broken pottery, often of ordinary cups and saucers, but in some cases it appears to have been either specially made or at least chosen for its particular colour and fitness. The shards are laid into the plastered surface in patterns and rosettes often worked into a high relief like the petals of a rose or some other floral form. The leaves of this flowering ornamentation are sometimes worked out in a similar manner, or they may be executed in stucco, each leaf evidently cast from the same master mould. The Phrachedi spires and the general decorations of the many of the small buildings at Wat Phra Keo, the gateways and other details at Wat Phra Jetubon and the Phraprang towers at Wat Arun are notable examples of this somewhat unusual mosaic decoration.

Sometimes the porcelain has been made in definite shapes and designs to form these decorative motives. Glazed tiles ornamented with pattern work in coloured enamels are often used to cover

whole wall spaces or are worked out in repeating and spot patterns on the plastered walls. Phrachedis are also to be found entirely covered with small glass mosaic tiles with a gold foil background. Enamelled copper plaques and strips are also used amongst this tile and mosaic work.

The criticism is sometimes made that the material and workmanship of this form of decoration do not bear close examination. This is partly due to the fact that the materials which have been available in the past are not of the excellent quality which modern resources have made possible. Besides, to carry out the enormous amount of this minutely detailed work, in the manner of first class craftsmen, would take up so much time and cost a lot of money. Therefore, a great deal of this work which is most effective when seen at the correct distance, is somewhat rough when examined at close quarters. But the rich and gem-like effect could not be excelled however excellent the craftsmanship might be. The results obtained from the use of this glass mosaic, bits of broken crockery and other such apparently unpromising materials are really remarkable in their decorative effect.

The inlaying of mother-of-pearl is a craft in which we Siamese excel. Some of the most beautiful doors of the Wats are entirely covered with such decoration, on a dull black background. The ornament is generally very fine and intricate, and unlike many of the other forms of mosaic will bear the closest examination. Birds, beasts, and mythological figures are interwoven with purely conventional ornament into graceful designs. In some cases, coats of arms and insignia of the Siamese Orders of Nobility are used as decorative detail.

In addition to the use of this inlay for the decoration of buildings it is also employed to ornament various vessels and objects used at ceremonies and in every-day life. These vessels are of characteristic forms and are usually constructed on a base of woven bamboo. This is then covered with repeated coats of lacquer into which the final ornament of mother-of-pearl or sometimes the same glass mosaic used in the gable decorations is inlaid.

A very beautiful form of decoration and one which is utilised to a great extent is the art of gilding ornament on a black lacquered background. This background is very carefully prepared and given repeated coats of a special black lacquer prepared from gums of the country, being well rubbed down between each coat. When a smooth ivory like surface has been obtained, and while the last coat is at the proper degree of stickiness, the ground not to be gilded is protected by being painted with a special preparation or resist. The whole surface is then laid with gold leaf and gently dusted off. The resist is then washed away, leaving the rich black background with the design in gold. This type of decoration is largely used on door and window panels in the Wat buildings and also for the decoration of the beautiful bookcases in which the sacred books and the Pali manuscripts are kept. Many charming examples of these bookcases are preserved in the Vajirañana National Library, and a good number are still to be found in the Wat libraries. This decoration is also used for screens, gongs, and a multitude of smaller objects. It is very permanent, especially when the objects so decorated have been kept under cover. Examples of two or three hundred years old are in existence, and often in a fine state of preservation.

Betel-boxes, trays, and various small objects are made by expert craftsmen, chiefly Lao, of plaited or woven bamboo covered with coloured lacquers, red, black, and green being used. They are also decorated in designs either in gold or more generally in black on red. The result is a rough but not unpleasing presentment of the bamboo and lacquer ware of Burma.

Metal Work.

The most notable work in metal is probably that of "niello" called "Tompat" in Siamese. This is the decoration of silver articles with designs on a dull black background. The design is first hammered down into the surface and cleaned up with a graving tool. The black substance which is a compound of several metals and other ingredients having a lower melting point than silver, is placed in the depressions of this pattern, in the form of a powder. The piece is then submitted to the heat until the black

filling fuses. The outside surface is filed down, scraped and polished, when the design appears in delicate forms of silver on the black ground.

As the heat often distorts the general shape, careful reforming must also take place, and to produce a really excellent piece of Tompat is an operation calling for great skill and precision.

The art of working Tompat could be traced back to the reign of King Phra Narayana of Ayudhya (1656-1688). Many examples of this old work exist in private collections and are often of beautiful workmanship and form. At one period the silver surfaces were finally gilded; but the most ancient and modern practices are to let them remain in their natural silver colour.

During King Chulalongkorn's reign this craft was practised only at Nagor Sridharmaraj, but the Arts and Crafts School in Bangkok has worked hard for some years towards the revival of this most interesting art, and under the patronage and encouragement of His late Majesty this school has succeeded in producing a work which is almost equal in workmanship to that of the best of the old examples.

This work is used for trays, bowls, betel-boxes, dishes, forks and spoons, cigar and cigarette cases, etc., and in houses of well-to-do people articles decorated in this maner are to be found in daily use.

Formerly the patterns used were generally religions symbols or mythological creatures. Figures of Taypanom (royally clothed postulants in the conventional attitude of adoration) encircled by a design of Kranok or other floral form or clouds are generally met with. The Rajasi, or mythical lion, often appears enclosed in a circle on the bottom. Hanuman, or the Monkey god, also frequently appears with other fantastic creatures taken from the legendary lore of the past.

Silver-work is also decorated in repoussé, in which the usual designs are represented in high and low relief. All sorts of articles are now made in this kind of work, such as photograph frames, napkin-rings, belt fasteners, and other modern contrivances as well as the older bowls and articles of purely Siamese use and

Siamese silver and niello wares.

form.

The Lao people are very clever at executing this type of Silver-work, and have many distinctive designs peculiar to the North. Sword handles and other old-fashioned weapons were often heavily mounted in this decorated silver-work, and bosses and coils of silver wire were used to decorate the sheaths and shafts of these weapons. A certain amount of silver inlaid work is to be found engraved on the iron blades of weapons and on other objects. Sometimes old cannon were heavily inlaid and ornamented with silver.

Enamelling on metals is an art which is much practised, and a large number of smaller objects for use and adornment are made of gold and silver enamelled work. A rougher type of enamelling on copper is also found and large water bowls and ceremonial vessels executed in this material are used in the Wats. The ground is generally yellow and the ornament painted on in enamel colours sometimes heightened by the use of gold and silver foils.

Jewellery.

Articles for personal adornment in gold and silver set with precious stones have always appealed to an average Siamese, not merely from a desire for display, but also as a means of keeping worldly wealth in a conveniently portable form.

Modern European jewellery is now largely in demand, but the old work of purely Siamese design is of great artistic merit. The Crown jewels and Regalia consist of many and varied articles for ceremonial use, swords, maces, ceremonial bowls and vessels, crowns of tapering form, etc. They are made of thin plates of virgin gold, beaten up into repoussé patterns and often literally encrusted with precious stones, mainly uncut rubies, with emeralds, sapphires, brilliants and other stones to a lesser degree. The gold is of a rich red colour artificially produced. Cremation urns, more particularly those used for the cremation ceremonies of Royal Personages, are made in a similar manner and are most beautiful examples of the Goldsmith's art.

The form of most of the older work follows the same lines as all Siamese ornamentation, and indeed this feeling for the

glitter and fantasy of gem-encrusted gold is an outstanding characteristic of even the architecture of the country. The workmanship of this old work is somewhat crude but decorative. The stones are mostly uncut, and the art of cutting precious stones does not appear to have even greatly practised by the craftsmen jewellers of the country.

Pottery.

The earliest known examples of Siamese porcelain were made at the kilns of Svargalok and Sukhodaya, in the early days when these places were capital cities. This work is made of a rough greyish biscuit and finished with a bluish green and grey glaze with outlines of crude figures or ornament appearing through the glaze. A small amount of this early porcelain still exists in the National Museum at Bangkok and in private collections. Distorted pieces and fragments will be found by digging in the rubbish heaps and sites of the ancient potteries, but as they are all discarded work, nothing of any real artistic merit is likely to be obtained there.

No white porcelain appears to have been made in this country. The present abundant white porcelain with coloured enamelled ornamentation, commonly known as "Siamese" porcelain, was not made in this country but in China.

From the latter part of the Ayudhyan period down to the beginning of King Chulalongkorn's reign, it was customary for the Kings and the nobles of this country to have their porcelain made to order in China. Doubtless, the patterns and designs were sent out to China to have them copied there. Most of them are decorated with typical Siamese ornament, although to a connoisseur the drawing and general form show Chinese workmanship.

The patterns went in fashions which were evidently set by the Royal taste, and mark epochs each with its own distinguishing characteristics. Thus, in the latter part of the Ayudhyan period and the beginning of the Bangkok era, a coarse white porcelain was in favour, covered all over the outside and, in the case of rice-bowls and cuspidors, on the inside also, with rough but vivid enamels laid on thick. Five definite colours are used and are laid on in a rather

coarse manner with rich enamel. The designs are somewhat similar to those found on the silverware Taypanom or figures in an attitude of prayer, Tewada or adoring angels, Nara Singh, half angel and half beast, are depicted in bright colours on a black or dark blue background, always surrounded by a type of the Kranok design of flame-like ornament or conventional cloud-like forms.

Lotus designs were also used, bowls being painted to look like open lotus flowers or covered with different coloured panels each of which bore a spray of the five lotus flowers, Bencha Pratum, which grow in the seven sacred lakes of Himaphan, the Siamese fairy-land. Sometimes a graceful diaper pattern was used to decorate the outside of rice-bowls, at one period green inside, at another white. Designs of birds and flowers on a gold background were usual. The Chinese makers in later times incorporated more of their own traditional details and signs with the Siamese patterns.

There are many interesting collections of this old pottery now in existence, and the market is full of modern imitations of the earlier work, which, although originally produced entirely for utilitarian purposes, have lately been recognised as of great decorative value. The fact of the comparative scarcity of the best pieces of course adds greatly to the interest in collecting the ware.

Weaving and Embroidery.

Weaving has always been practised in this country and at the present day the art is carried on in the Korat district and also in Chiengmai. The tunics and panungs formerly worn at Court functions were of home woven silk, richly brocaded with borders and intricate diaper patterns. Beautiful silk panungs are made either in plain rich colours or decorated with designs worked out in stripes, checks and flowered patterns. The colours are the most vivid obtainable, and in many cases short colours of various hues are blended. In the North where the "pasin", a kind of skirt, is used, lines, bands, spot patterns of flowers and diaper designs are worked out in gold thread or colours.

Embroidery in gold and silver thread and in colours is

largely used for the ornamentation of "palm-leaves" used by the monks and many other articles.

Small boxes, cases, and other objects are made of neatly woven grasses and creepers, and the art of making endless forms of baskets and other useful receptacles is greatly practised all over the country.

Decorative arrangements of real flowers are much used for Wat ceremonies; and extraordinary skill is shown in their construction. Flowers are picked to pieces and their various parts used to build up the most elaborate garlands and other hanging decorative arrangements. Other flowers are built up from parts of totally different species and are so well done as to deceive all but the most inquisitive.

Clever toys are also made from very simple materials and the people show generally a very great aptitude for design and decoration in all the local crafts they practise.

The Government School of Arts and Crafts is doing invaluable work towards the development of some branches and the revival of the national arts which, in the stress of modern life, have become almost extinct.

Architecture.

Architecture is the outcome of one of the earliest of human needs and in the history of this art, the religious instinct has always been concerned. In Siam, this effect of religion on architecture is especially pronounced. Practically all buildings of any importance from ancient ruins up to the period of the modern development of the country are temples and monasteries dedicated in early days to Brahmanism and at a later date to the religion and teaching of the Buddha.

Modern Siamese architecture is a style developed from the earlier Khmer architecture, of which the greatest known monuments exist at Angkor Wat and Angkor Thom near lake Talé Sap in Cambodia, and ruins in a similar style are scattered up and down the country as at Bimai, Sukhodaya, Svargalok, Bisnulok and Lopburi, and in many cases are buried in the remote jungle, far from any present human habitations except the villages of

The Phra Meru, or crematorium at the royal cremation of King Chulalongkorn.

jungle folk.

The founding of Sukhodaya in the middle of the XII century marks the commencement of the ascendency of the Thai people, the forebears of the modern Siamese, in the Menam Valley. These primitive people must naturally have followed the customs and arts of their more civilised neighbour, and indeed it may not be possible to draw a firm line of distinction between the two, as doubtless the Khmer and Thai to a great extent assimilated, and the builders and artists of the new kingdom carried on the old Khmer traditions of architecture, existing examples of which would be their only models in the art of building.

For these reasons the ruins at Sukhodaya, Svargalok and Bisnulok are of the same style of Khmer architecture as the ruins at Angkor, Bimai and other places in Eastern Siam, the only difference being that these latter buildings were constructed of a fine grained red or grey sandstone which was invariably quarried from a site near to the buildings and so easily obtained.

The Sukhodaya district does not possess such a fine building material, therefore the builders of the temple and palaces of the early settlements turned to laterite, a sort of decomposed limestone of reddish colour, of which there is a large amount available both here and in many other parts of the country.

The builders of these times also became very proficient in the art of plastering and making well modelled detail in this material.

The ruins extant of Khmer buildings have the roofs and gables made of stone. In these buildings wood was apparently only used for doors and the construction of false ceilings to mask the inside appearance of the roof construction, this woodwork being generally richly carved.

It is however highly probable that wood was used in ordinary houses and perhaps for even more pretentious structures, but the form this work took is unknown, any such buildings having long since disappeared.

But the ruins of the Sukhodaya period show clearly that the roof of the actual temple buildings were constructed of wood.

The hole where the beams of the roof entered the walls and columns are clearly to be seen, although all vestige of the wood work has gone, and apparently the roof form followed the tier upon tier method so familiar in the later development of Siamese architecture.

The gable ends of these buildings were also constructed in timber and were the prototype of all the later developments which produced the Siamese style as seen in Bangkok. The decorative motives of all these ruins follow the same traditional forms, all having a meaning and language of symbolism which devolves from Indian mythology, from the earliest religious conceptions to Brahmanism and later from the doctrines of the Buddha. Most of these ancient forms and symbols have their counterpart in modern Siamese architecture.

The ruins of Wat Phra-pie Luang and Wat Sri Sawai, both at Sukhodaya show the Phraprang form in its highest excellence of stucco and laterite work. Also the Phraprang at the ancient Wat Chinnaraj at Bisnulok and the "bote" itself, although doubtless renovated from time to time, are excellent examples of this early work. During the Ayudhya period the present style of Siamese architecture was evolved, the traditional forms of which are now to be found in the older temples and palaces of Bangkok.

After the final recovery of the Siamese from the Burmese invasions, King Phra Buddha Yot Fa Chulalok moved his capital from Thonburi to Bangkok and from this date A. D. 1782 the building of the Grand Palace and most of the temples of Bangkok commenced.

At the present time these temples or "Wat" as they are more properly called, cover an area of about one-fifth of the city and number over three hundred and ninety, so that it will readily be seen that they form a very distinctive and striking feature of the capital, and indeed without them much of the present charm and beauty of Bangkok would be lost.

A Wat is a collection of buildings used as a Buddhist monastery, each separate building having a specific use. The main temple building, the "Bote", is rectangular in plan and contains

one hall of single storey usually of very lofty proportions. This large hall is generally divided into a central nave and two side aisles, by a double row of columns or piers. These thrust upwards to a towering height and support the main members of the roof trusses, the lower beams of which are often left visible. These beams are painted vermillion and are decorated with bands of rich ornament, usually gold on black. The upper portion is closed with a wooden ceiling which is decorated with star-like ornament on a vermillion ground. The columns are generally of massive proportions and are constructed of plastered brickwork, being built to a taper as they go upwards. The walls are very thick and also constructed of brickwork, with a plastered surface. The interior surface of walls and columns are generally covered with tempera painting usually representing scenes from the Ramayana; in some cases they are covered with traditional repeating ornament of intricate design.

The windows, placed at each long side wall, are compared to the general scale of these buildings. The doors are large and usually six in number, three facing the group of Buddhas and three at the back, the middle door of each set being usually larger than the side doors. The openings of these doors and windows are considerably narrower at the top than at the bottom. The frames are of teak and the leaves of both doors and windows (also teak) are in two flat panels, without mouldings but divided by a large mullion, which however is an integral portion of one of the leaves and opens with the doors.

A peculiarity of these buildings is that the outside walls are always given a slight inward slope, which is again re-echoed in the piers of the outside colonnade. The chief feature of Siamese architecture is the method of roof construction and decoration. The roofs are usually arranged in three distinct tiers, the upper one having the steep pitch of a Gothic roof and the lower ones decreasing in angle as they descend The general line thus suggests a graceful curve.

In addition the roofs of the end porches interpenetrate the main roofs at a lower level, and have also the same arrangements

of tiers and the same relative pitches. The roofs are covered with glazed and coloured tiles, the greater portion of the centre a rich reddish yellow with a border of a narrow strip of light yellow and a surround of green. These colours are often varied but this is the most common arrangement.

The gables, at each end of the building, are framed with a carved teak representation of the same Naga (snake) found at the gables of the Khmer architecture, only adapted and altered to the lighter method of carved wood. The heads are at the lower eaves of each tier of the roof and the undulating body, surmounted by crests or indentations, and following a traditional curve which is arranged so that the main purlins of the roof trusses project beyond and support this decoration, and climb up the slope at the roof to end in the curiously shaped horn at the extreme apex. The gable itself is invariably profusely decorated with richly carved woodwork, generally with a central portion in high relief representing Brahman divinities, such as Indra on the elephant or Vishnu on the Garuda, and the whole surrounded with a framework of flame-like ornament containing Tewada or adoring angels. The lower base of this gable is framed in with a border of carved ornament of traditional design. In some cases the gable treatment is varied and the design purely of ornamental forms.

The whole of this elaborate composition is decorated with any rich jewel-like colour, the Nagas being usually inlaid with either gold or a coloured glass mosaic laid into a ground of black pitch-like substance. The gable decorations are generally overlaid with gold leaf and also have the background inlaid with this glass mosaic.

The area occupied by the Bote is generally separated from the rest of the temple by a low wall, and is marked off by stones (sema). These are eight in number and are placed at the cardinal points of the compass, they represent the leaves of the sacred Bo-tree and are intended to ward off evil influences.

In addition there is always another building very similar to the Bote called the "Vihara." It can be distinguished by the absence of the sacred stones surrounding the Bote. It is usually used

for feasts and ceremonies and general assemblages of the ordinary folk. Generally the Bote alone but in some cases both Bote and Vihara are surrounded by a rectangular cloister which cuts off the sacred area from the outside world. The roof, doorways, etc., of this cloister are architecturally treated in a very similar manner to the main buildings.

In the immediate vicinity of the main buildings are found "salas" or shelters, libraries, bell towers and other buildings of lesser importance. Also Phraprang of a more slender type than the original Khmer models, Phrachedi, of various form, size and decorative treatment, all planned in certain order round about the main enclosures.

The dwellings of the monks, sometimes of brick but often of wood and quite distinctively Siamese in style, are situated near the temple buildings. The whole temple enclosure is surrounded by a wall, often with a crenelated top. Access is obtained through wide doorways which can be closed by large and massive doors of imposing appearance and strength.

Inside the enclosure of the Royal Palace is to be found a complete compendium of Siamese architecture. The group of buildings known as Wat Phra Keo, or the Chapel Royal of the Emerald Buddha, was commenced in 1785 A. D. to house this famous statue.

The whole group of these buildings are most sumptuously decorated, they are exclusively reserved for Royal ceremonies and have no resident monks. The Phratinang Dusit Mahaprasad, the Amarindr Vinichai Hall, the old Audience Hall on the Eastern wall of this enclosure, and many very beautiful salas and other buildings of purely Siamese design are amongst the finest examples of art to be found in the country.

The Siamese excel in the art of constructing temporary buildings which are used at various ceremonies connected with the Court, monastic and everyday life. The finest examples of these temporary buildings are those erected for the cremation of the mortal remains of Members of the Royal Family. The arrangement and style of these buildings again follow more or less closely

on tradition, but the general architectural details are similar to those of the temple buildings. The central Phra Meru, or building in which the actual cremation takes place, is usually a lofty erection of cruciform plan with many tiered roof and gables and surmounted by a spire or spires of Phrachedi or Phraprang form. The whole is surrounded with salas for the use and shelter of His Majesty, Princes, priests, nobility and officials of the Government. The whole of these elaborate buildings are constructed of wood, bamboo, attap and woven matting. The roofs are covered with coloured cloth, giving an arrangement of colours somewhat similar to the temple roofs. The gables are decorated as is the rest of the edifice with gold and coloured papers, cut out in a stencil-like manner and giving the appearance of the rich lacelike decorations of Siamese ornament in a glittering and realistic manner.

After the completion of the particular ceremony for which these buildings are erected, the whole of the beautiful structures are pulled down.

Domestic Architecture of purely Siamese style, is simply constructed of teak and roofed with a thatch made from the leaves of the attap palm. A roof of small red earthernware tiles is also used and is very pleasing in appearance. The tradition of the Siamese temple roof and gable is suggested in a very simple and graceful manner. The walls may be a plaited bamboo, or some such flimsy material; but in the better class of houses, they are of a kind of teak panelling without the use of mouldings. These buildings are simple in plan, being merely small rectangular rooms. They are often planned round a courtyard, the whole being raised from the ground on posts and entirely closed in by a fence in the front, with stairs and entrance gate. The same kind of building is used for the "floating houses" so characteristic of the riverside dwellings to be found all over the country, being similar in form but supported on floats.

As the result of European intercourse with Siam many forms of "European" style have been adopted. The road-side shops are either wooden structures or a particularly monotonous type of

more modern shop house which has been evolved. In the Chinese quarters of the City a number of lofty erections of the kind found in Hongkong and Shanghai are replacing the older buildings. A few of the business firms have erected buildings in the Renaissance style, and many Government Departments are now housed in blocks of offices erected in European style. The Ananda Samagom Hall is a fine example of modern Italian Renaissance and is largely constructed of materials imported from abroad, being faced inside and out with marble slabs.

On the whole the recent modern development of building cannot be considered as altogether satisfactory, when compared with that of the real architecture of the country. Siamese Architecture is altogether the result of a natural growth and purely traditional form, the individuality of modern European architecture being entirely absent. In this respect, the style follows the rule of the great architectural masterpieces of the world in " not being a thing of will, of design or of scholarship, but a discovery of the nature of things in building, a continuous development along the same lines of direction imposed by needs, desires, and traditions." Some attempt has been made to carry on an adaptation of these traditions in the case of a few recent buildings such as the Vajiravudh College and the scheme for the Chulalongkorn Memorial University. More effort will doubtless be made in the future to continue the development of this very distinctive and national style of Siamese Architecture, which by effort and experience can be simplified and adapted to modern needs.

CHAPTER VII

THE SIAMESE THEATRE

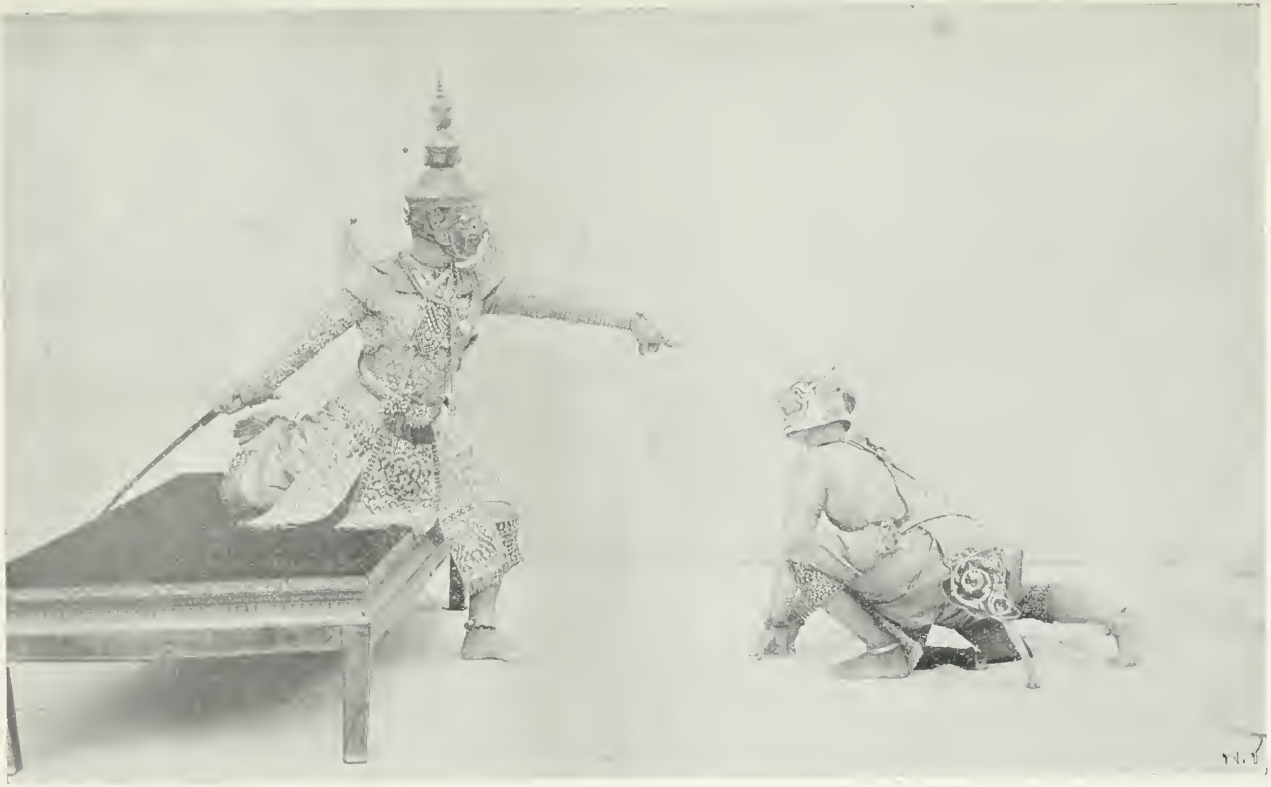
The Siamese Theatre provides many forms of entertainments: some, such as plays adapted from the European stage, are frankly modern; others, while aping the ancient drama up to a certain point, are designed to meet the demand of certain sections of the present-day audience for speedier action than is possible in the ancient drama. In the coarser form of entertainment, grace is sacrificed to greater speed, and verbal dialogue takes the place of much of what is usually known as the Gesture-language. Such is the Yiké or Liké, which is to be seen any evening performing to crowded houses in the entertainment halls of Bangkok. It provides amusement for a class of people whose taste is not exacting, and who are more entertained by a clown than by an accomplished actor.

Of the ancient forms of Siamese plays, the *Hun* (*u* pronounced as in *bull*) and the Nang (*a* pronounced as *u* in *tub*) may be briefly noticed.

The Hun.

This is known in Europe as the marionette. The expression *hun* literally means "model". As in Europe, the figures are moved by strings, which, however, are pulled from below, and not from above. The figures, the largest of which are over a metre in height, are well made and elaborately dressed, the costumes being similar to those of the human actors. The best specimens of *hun* figures in existence are to be seen in the National Museum.

The ancient form of *hun*, as above described, is scarcely ever seen nowadays, but there is a modern variety which is more popular. Instead of enacting stories of the classical drama, as is done on the ancient *hun* stage, it presents plays of a less elaborate description, and is thus able to provide more fun. This new



Khon Characters.

The Demon King *The Monkey, Hanuman.*

Note : The demon is in an attitude of anger, and is about to whip the monkey, who is in an attitude of mockery.

variety is known as *hun krabok* (*o* as in *box*), literally, "cylindrical model." It is operated in the same manner as Punch and Judy, to which it is similar.

In a *hun* performance, the story of the play is sung or recited by a singer, who is assisted by a chorus, to musical accompaniment. The figures are moved about to suit their actions to the words. Jokes are introduced into the dialogue where possible, and in the modern variety, the clown plays an important part.

The Nang.

The expression *nang* literally means "skin" or "hide" and is usually translated into English as "Shadow-play". The figures are often beautiful pieces of Siamese art, and excellent specimens are to be seen in the National Museum. Figures are drawn embossed and painted on skins, which are mounted on sticks. A large screen of white sheet is set up with strong light behind it, and the figures are shown against the screen. The figures (or pictures) on the skin represent characters in the ancient drama, and stories therefrom are presented. The singer and the chorus sing and recite the words of the story, and the figures are moved about the screen by men who dance as they move. The entertainment is appreciated mainly by those who like the pictures, watch the dancing, and listen to the songs, the recitation and the music. Now and again clowns appear, and create laughter with their jokes. Otherwise it is not easy readily to appreciate the play, the taste for which must be acquired.

The *nang*, like the *hun*, has its popular variety in a form called *nang talung* (*u* as in *bull*). *Talung* is the corrupted name of a town where the entertainment is said to have originated. The figures are smaller, and are so made that at least one arm can be moved. This form of *nang* usually avoids the classical plays, which do not admit much comicality, and thus meets the popular taste

The Classical Drama.

The classical drama of Siam, though not indigenous in the full sense of the word, has, for many centuries, become peculiar

to the country. The art has all but died out in India, the country of its origin, and is not to be seen outside Siam nowadays unless it has been copied from this country, or taught by Siamese instructors. To this sweeping statement there is a possible exception. In Java, the plays which are occasionally to be seen performed by royal troupes of players in the Palaces of the Sultans have many points of similarity to the drama of Siam.

In India, the origin of the drama is attributed to a mythical inventor called Bharata, an ancient sage the details of whose life are shrouded in mystery. His Treatise on Dramaturgy, however, is usually assigned to the 6th. century A. D., and it is on this book that the subsequent Indian works on the ancient drama are based. Bharata is supposed to have acquired the art of the drama from one of the Hindu Chief Gods, who, as God of the Drama, condescended to instruct the sage for the benefit of the minor gods and the human race. All this is Hindu mythology, with which the drama in Siam is not concerned. It is known for certain, however, that the art came originally from India, but there is no record to show when and how it was introduced into this country.

The Siamese drama proper may be divided into two major categories, viz.,

(1) The Khon (*o* as in *tone*), usually known in English as "Masked Play," that is to say, all the male characters wearing masks;

(2) The Lakon (*o* as in *on*), in which the male characters do not wear masks unless they represent demons, monkeys or other parts which are neither celestial nor human.

The STAGE on which the play is performed is of the simplest description. Usually there is no stage as the expression is understood in the West: a clear space large enough for the dances and actions is all that is necessary. Very little furniture is used. There is usually a wide bench at one end, or one at each end, for the important personages. For a garden or forest scene, a few plants in pots placed at regular intervals serve the purpose.

A bed room scene is provided by a screen placed before the bench above referred to. The simplicity of the Siamese theatre, in fact, is more pronounced than that of the Greek theatre itself.

The COSTUMES and PROPERTIES on the other hand, are most elaborate, and are made as accurately as possible. The costumes resemble those worn in Siam in the olden times, exaggerated in some respects for stage effect. They are found to be picturesque and suitable, and have not been changed during the successive generations. The costume of a royal personage consists, in the first place, of a pair of drawers, which reach down below the knees. The lower edges of the drawers are richly embroidered, and show beneath the cloth which is worn over them. The cloth is usually gold brocade, a broad and long piece, and is worn outside the drawers round the waist, passed between the legs and tucked in behind the back, falling to just above the knees. It is held in place by a broad sash, over which again is worn a jewelled belt. A tight-fitting jacket is used, together with a pair of epaulettes and collar, all richly embroidered. Many ornaments are worn, such as bracelets, anklets, rings, and so on. A breast-piece is often used to represent armour, and a crown or coronet completes the costume. Other male characters are similarly arrayed, but less elaborately. The costume for female characters consists of a broad piece of gold brocade worn as a skirt, reaching well down below the knees, and held in place by a gold and jewelled belt. Over the upper part of the body, a scarf, or a pair of scarves sewn together, is worn with one end draped and held just above the belt in front: the middle part of the scarf has a slit through which the head is put, the shoulders being thus covered. The other end of the scarf hangs down the back to about the level of the skirt. For ornaments, a jewelled collar, a necklace, bracelets, armlets, anklets and rings are worn. Queens and royal ladies wear crowns or coronets; others have other head-dresses suitable to their parts. The making-up is simple; the face is merely made white with powder thickly put on. The actors and actresses who play what may be termed "character-parts" such as monkeys, demons, etc., wear distinctive masks of

different colours and designs: in the *khon*, as has been stated, all male characters wear masks. The mask is purely conventional, and is not intended to be life-like. Each mask is a good example of Siamese decorative art; it is distinctive and characteristic, so that the wearer is recognized at once for the character which he represents.

Animals, when they appear, are also known by their masks, which are well-made and often true to nature. Apart from the mask, an "animal" merely wears a pair of trousers and a jacket of a colour somewhat similar to that of the beast represented.

MUSIC is an important feature of the Siamese drama; but as it is a branch of study in itself, it can only be touched upon here. The music, like practically everything connected with the Siamese theatre, is greatly bound by tradition. Thus, although it is permissible to alter what may be called the "singing tunes" up to a certain point, the "action tunes" may never vary. Each "action tune" is a conventional signal in itself, and is indissolubly connected with certain dances and actions. Thus there is a walking-tune, a marching-tune, a weeping-tune, a love-making tune, an anger-tune, and so on. When the orchestra strikes up one of these tunes, even a person outside the theatre knows what is going on inside.

The Siamese THEATRE ORCHESTRA consists of a set of instruments which must be at least five in number, namely, a xylophone, a set of gongs, a flageolet, a (kind of) tom-tom, and a pair of drums. Nowadays the orchestra has been enlarged by the addition of more instruments of a similar character. This is not the place to give a long description of the instruments, but the following details may be given of the usual present-day Theatre Orchestra:—

(1) An alto xylophone made of bamboo pieces strung together and hung on the top of an oblong soundbox made of wood, carefully designed and artistically finished.

(2) A basso xylophone, similar in appearance to the above.

(3) A set of large (basso) gongs, graduated to scale and

hung on a circular frame-work.

(4) A set of small (alto) gongs, similar in appearance to the above.

(5) An alto flageolet, a kind of harsh oboe.

(6) An basso flageolet, do. do.

(7) A (kind of) tom-tom.

(8) A set of three drums.

The above are the most important parts of the orchestra, but certain minor instruments may be added.

Having given the above particulars concerning the Siamese Theatre, we may now give further details of the two distinct forms of drama, and indicate in a brief manner the essential difference between the two.

The Khon.

The *khon* is a form of drama which is undoubtedly very ancient. As in Ancient India the drama sprang up in connection with the cult of one of the Chief Gods, so in old Siam the *khon* was presented on stated occasions in the form of pageants of a religious nature. Thus in one of our ancient laws it is distinctly stated as taking place in that form as a part of the ceremonies in connection with the Coronation of Kings. From its religious nature, the *khon* has deteriorated into a mere form of amusement during the successive generations. It is expensive, and is therefore not often seen. In this drama, practically all the actors, apart from those playing feminine parts, wear distinctive masks from which their respective roles are recognised at once by the audience. Although women sometimes take part in the *khon*, they do not do so as a general rule, the female parts being usually taken by men. This is easily understood, and will be made clear to the reader presently. In a *khon* performance, the dancing and posturing are both graceful and expressive, grace and expression being nicely combined. Not merely the arms and hands, but the whole body has to be used, and a great deal of muscular exertion is necessary. The actor must have a very supple person and the balancing of the body in some of the postures indicates the strenuous training which the actor must

undergo. The pictures, from photographs, which serve as illustrations in this chapter, give some idea of the difficulty of the art. Needless to say, training of a *khon* actor is long and tedious, and, in the first stage, resemble a thorough gymnastic training. It takes the best part of a year, often longer, for a young actor to attain anything approaching proficiency. A man who has passed his first youth cannot begin to learn the art.

With such strenuous dancing and posturing (herein lies the reason that a *khon* actress is the exception rather than the rule), it is obviously impossible for a *khon* actor to speak his own lines and be heard: again, the mask which he wears would not allow him to be understood even if he attempted to speak. Consequently, the actor's lines are recited for him by a reciter, the actor suiting his action to the words. Again there are occasions when the actor relies solely upon pantomime to express himself. This is known as the Gesture-language, and is employed throughout the performance, whether the words are also recited or not. The pantomimic action can be as expressive as words, sometimes more so when performed by a good actor.

In the genuine *khon* of the old style, there is no singing by a chorus, the reciter being relied upon to give all the words of the play. The result is speedier action. The method has, however, undergone a change, and singing has, in some cases, been introduced to alternate with the recitation.

The plays presented by the *khon* are always some portions of the Indian Epic, the Ramayana, practically the whole of which has been done into Siamese in a form of poetry suitable to the drama.

The Lakon.

In this form of drama, the players do not wear masks, unless they represent the parts of demons, monkeys, or other beings which are neither celestial nor human. Both men and women appear in the *lakon*, but it was not customary for them to play together. A company of actresses, when acting a story, would take the male parts themselves; while in a play performed by a company of men, the female parts would be taken by some of

A posture, known as "the dancing bird-man." The bird-man is stated to be like the Greek harpy in appearance, but, unlike the latter, it is a gentle and harmless creature.

them. Nowadays, one occasionally sees men and women acting together, but that is not the general rule in the higher form of drama. It appears that, in the past, going back for some centuries, the *lakon* was performed solely by men—the women *lakon* being comparatively modern. The entrance of women into the art took place within, say, the last 200 years, and as grace is emphasized rather than strenuous action in this form of drama, the women caught the popular fancy almost at once, and continue to be in favour up to the present day. In the training of a *lakon*, greater attention is paid to the graceful movement of the body, hands and arms, almost to the exclusion of muscular exertion, except in the "character parts", where the energetic action of the *khon* is retained in a milder form. In other words, as the strong point of the *khon* is its strenuous virility, so grace of action is the strong point of the *lakon*.

There is another important difference between the *khon* and the *lakon* which may be stated. While the words of the *khon* are mostly recited, the words of the *lakon* are nearly always sung. The actors and actresses themselves do not sing; it is done for them by a chorus, with a leader. The players of the *lakon* may, however, speak for themselves on suitable occasions during the performance. When the lines are sung for them, the players employ the Gesture-language to the full; but when they themselves carry on the dialogue, the dumb language is not so much used.

In the foregoing pages an attempt has been made to give a description of the Siamese Drama as intelligibly as possible within the covers of a short article. The subject is a large one, and much must, necessarily, be left out. It remains to be added that although the *lakon* does not, like the *khon*, confine itself to the story of the Ramayana, yet Siamese dramatic literature is not extensive, and new plays are seldom presented. Writing a new *lakon* play is a difficult proposition, because, whereas a book is in existence as soon as it is written (whether published or not), a play does not come into being until it has been produced. A mere writer does not know whether his play is suitable for

presentation on the stage; he cannot say whether the product of his pen will fit with the Gesture-language, the dancing, and so on; he cannot tell until it has been tried, one part at a time, in actual rehearsals. At the rehearsals, the author must be present to make changes in his work to suit the art as his mistakes are revealed, or when he finds that his words do not admit interpretation in the Gesture-language, and so forth. A playwright, therefore, must have the services of a company of *lakon* players at his disposal, and employ them in the process of writing his play. That being the case, the reader will understand why Siamese dramatic literature is not extensive, and why new plays are not often seen. The Siamese audience go to a play not to see a new piece, but to see the *acting* of their favourite stories.

Other Forms of Lakon.

Having briefly disposed of the classical drama, reference may be made to other popular forms of *lakon* to be seen in Siam.

A *lakon talok* (Comic Drama) is a form of entertainment which is much in demand all over the country. Comicality is the keynote of the play, and the fine points of the classical drama are not attempted. Men and women act together, and aided by a chorus, usually sing their own lines.

Primitive forms of *lakon* are to be found in Southern Siam. Their very primitiveness is their chief attraction. The important postures and gestures of the ancient drama are all retained in this form of play, unadorned by the embellishments which have been introduced during the successive generations. The kernel of the dramatic art, so to speak, is seen in Southern Siam, but without the elaborate stage costumes and properties, and, with the players speaking in a dialect not readily intelligible to the inhabitants of Central Siam, the play is not fully appreciated by people other than Southerners.

It may be stated, in conclusion, for the benefit of such readers as may desire to pursue the subject further, that a book on Siamese Dramaturgy has been published by the National Library, and is available at the Royal Institute. Though in Siamese, the book is copiously illustrated, with nearly 200 full page pictures.

CHAPTER VIII

STRUCTURES OF NOTE IN BANGKOK

The Royal Palace.

The Grand Palace is in reality a walled town covering an area of over a square mile. Besides the Chapel Royal (Wat Phra Keo) to which a special notice is devoted, the principal objects of interest within the precincts of the Palace are the three Halls of Audience, viz., Dusit Maha Prasad Hall, Amarindr Vinichai Hall, and the Chakri Palace. The first two are contemporaneous with the foundation of the new city of Bangkok, in 1782, and were constructed during the early years of Rama I.'s reign.

I. Dusit Maha Prasad, which is considered as the finest building inside the Palace, and is certainly one of the jewels of modern Siam architecture, was erected for ceremonial purposes, such as receiving envoys from foreign countries. Biman Radhya Hall, which stands behind, being used by the King as a place of residence.

King Rama I.'s coronation took place in Dusit Maha Prasad, but after his demise, the golden urn containing his remains was exposed in that Hall, and afterwards it became customary to hold the Coronation ceremony in Baisal Daksin Hall (see below).

II. Amarindr Vinichai.

The Amarindr Vinichai Hall is the anterior part of a system of chambers, the last of which was originally used as a place of residence. The middle Hall, Baisal Daksin, where important ceremonies (such as the Coronation), and solemn audiences take place, contains the gorgeous pavilion on which the King appears on these occasions.

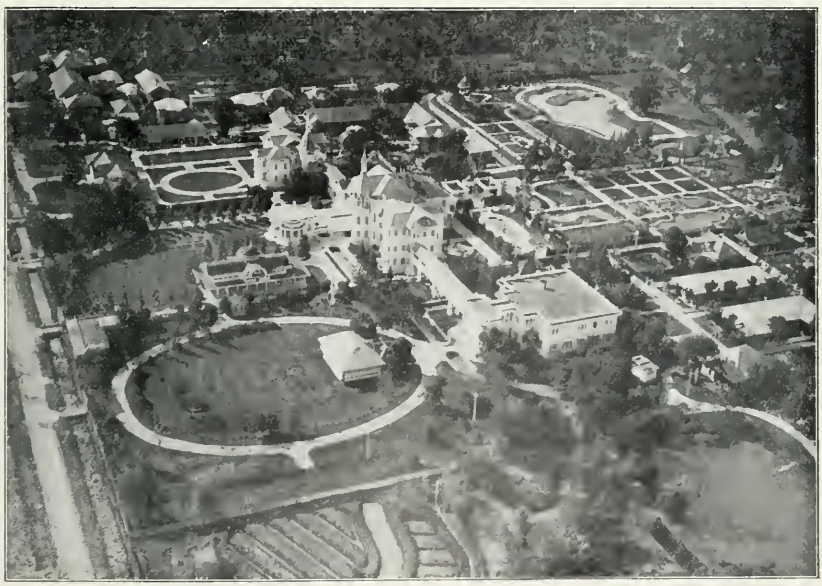
III. The Chakri Palace is an imposing building constructed after the plans of a British architect in the style of the Italian Renaissance, but covered with a roof of pure Siamese style. The greatest part of it is occupied by the Throne Hall.

Wat Phra Keo (The Chapel of the Emerald Buddha).

The Chapel Royal or Chapel of the Emerald Buddha, usually called Wat Phra Keo, is the most interesting of Bangkok's temples. Since its foundation (1785 A. D.) it was never allowed to fall into decay. In 1848, King Rama III. undertook important repairs, especially in the Chapel itself; King Mongkut added to the original edifices a number of important buildings; and on the occasion of Bangkok's centenary, His Majesty King Chulalongkorn made new and extensive repairs to the temple.

"The Royal Temple stands within the circumference of the "outer wall that surrounds the palace and the government offices, "and on account of the part it plays in important State ceremonies "and because it is the King's own place of worship, it is far more "elaborate than any of the other temples of the country . . . . . A "central Phra Chedi stands in the courtyard of the temple, "surrounded by many similar structures of lesser height and "beauty. The large one in the centre towers high above "all the surrounding buildings . . . . . It certainly looks like a "solid mass of gold, and at sunrise and sunset when it "catches the roseate hues of the rising or the setting sun, "its golden surface can be seen from afar, shining and "glittering like a second sun itself, above the coloured roofs of "the temples and the white or many-tinted spires that are asso- "ciated with it. The smaller relic mounds are covered with "mosaics of glass and enamel roughly set in plaster . . . . . At "a distance the rude character of the workmanship is totally "hidden, the tawdry appearance of the material is completely "lost, and as the uneven surfaces reflect the brilliant light of the "sun, the spire-capped shrines form a series of glittering satellites "around the central spire of gold . . . . . The court-yard which "contains all the vari-coloured and fantastic shrines and images, "is paved with slabs of white stone and marble, which reflect "the heat and light of the sun with oppressive intensity. Other "creations in marble, bronze, stone, and wood, set with the same "mosaics of cheap china and common glass, and representing "Europeans, fishes, dolphins, and fabulous monsters are scattered

Within the Grand Palace.



Phya Thai Palace, Bangkok.

"profusely but irregularly amongst the larger and more conspicu-
"ous monuments. The roofs are covered with coloured tiles.
"There is a central rectangle in orange, yellow or red with its
"edges set parallel to the roof, while round it run several borders
"in red, blue and green. Owing to the height of the buildings
"these coloured roofs are always so far removed from the eye of
"the spectator that they never lose their artistic appearance.....
"Round the edges of the roofs of several of the constituent build-
"ings of this Royal Wat are hung many small sweetly toned
"bells, whose silvery voices may be heard in the farthest corners
"of the enclosure as they swing to and fro with every gentle
"breeze. The windows and doors are deeply sunk in the extre-
"mely thick walls. They are covered with black lacquer and look
"as though they were made of ebony. Designs in mother-of-pearl
"have been worked into the lacquer, while the hinges and fasten-
"ings of the separate shutters have been richly gilt."(1)

This collection of chapels, halls, towers, etc., can be divided into two groups:

1) the Bot or Chapel of the Emerald Buddha properly so called, and the small edifices which stand around, viz., three small chambers on the west, twelve salas (four on the northern and southern sides and two on the eastern and western), the belfry on the south and a small chapel in the south-eastern corner; 2) the buildings on the platform on the North of the Bot, to which can be added the Library in the north-eastern corner and another small chapel in the north-western corner.

1) The Bot or central chapel was erected by King Rama I according to the usual plan of Siamese temples, for the purpose of keeping the famous Emerald Buddha, whose story is thus related by King Mongkut himself:

"Those persons having understanding, both those who are
"followers of the Buddhist religion and those who are friendly to
"His Majesty the King of Siam, are invited to listen to the fol-
"lowing account of the Buddha Gotama made of a solid beau-
"tiful green stone, or jasper. It is supposed to have been

(1) E. Young, *The Kingdom of the Yellow Robe*, pp. 286-290.

"made by the ancient followers of the Buddhist religion, "but by whom it is not certainly known by the people of "present day, for its narrative account is lost in antiquity. The "image was made to represent the Buddha Gotama, but at "what time it was made it cannot be ascertained; yet it "is ascertained that it must have been made many years ago, "probably within the first 2000 years after the death of Buddha "Gotama, corresponding to the year 1457 of the Christian era, for "it has been worshipped for a long period.

"We cannot give an account which is certainly worthy of "belief, because many of the Cambodians, the Northern Siamese "and the Lao Shiang and Kao, have a tradition, which is handed "down to the present day, that this jasper image has been in each "of their respective countries at such a time; but the evidence of "these persons cannot be trusted, as they exceed the bounds of "truth and they do not agree with each other. These traditions "are probably mere conjectures, and are not worthy of credence. "We shall therefore omit these statements, and give the account "which is most current in Siam, from the time it was certainly "known, and which cannot be gainsaid.

"1979 years after the death of the Buddha Gotama, corres- "ponding to the year 1436 of the Christian era, a small pagoda, "which was within a large one, in the city of Chiengrai, in the "Kingdom of Chiengmai, was struck by lightning and destroyed "when this jasper image was discovered; but it was supposed to "be made of common marble and not of jasper. It was then placed "in the temple. After being there two or three months, the gilding "wore off, when it was discovered by all that the image was made "of jasper. It was then removed to the city of Lampang, one of the "then capitals of the kingdom of Chiengmai, where it remained "32 years. In the year 2011 of the Buddhist era, or the "year 1468 of the Christian era, it was removed to the new city "of Chiengmai, the new capital of the kingdom, where it remained "84 years. In the 2095 Buddhist year, or 1552 of the Christian "era, the kingdom of Chiengmai became weak, and the kingdom "of Lao Kao became powerful, and obtained this jasper image,

"and removed it to the city of Lau, then the capital of the "kingdom of Lao Kao where it remained 12 years. It was then "removed to the town of Vieng Chan, the new capital, where "it remained 215 years. In the year 2322 of the Buddhist era, "or 1779 of the Christian era, the present capital of Siam was "established, and the first king of the present dynasty, who then "reigned under the title of Phra Bad Somdetch Phra Buddha Yot "Fa Chulalok, and occupied the present royal palace, subdued "the whole Lao people who consented to yield to his authority. "He removed the jasper image to the capital of Siam and placed "it in the town built on the west bank of the river, in a place "called Thonburi, where it remained 3 years. Immediately "after the jasper image was brought down here, he commenced "to build the present capital of Siam on the eastern bank of the "river opposite the old town, and after 3 years it was completed.

"In the 2325 Buddhist year, or 1782 of the Christian era, in "the 6th. month, corresponding to the month of May, this jasper "image was removed to the new capital, and placed upon a golden "throne 34 feet $2\frac{3}{4}$ inches high and gorgeously arrayed with "ornaments of gold and precious stones, which are changed "3 times each year." (1)

The sacred image which was installed in the Chapel on Monday, the 4th day of the waxing moon of the 4th month of the year B. E. 2327 (1784 A.D.), is placed upon a gorgeous altar. The upper part of this altar which is contemporaneous with the construction of the chapel, is raised on a basement added by King Rama III. On each side are two standing images of Buddha, Phra Buddha Yot Fā Chulalok, and Phra Buddha Loes Lā Nabhalai, personifying the first two kings of the present dynasty.

The aspect of the building itself has not changed much since its foundation. The timber-work was renewed by Rama III. and King Chulalongkorn. The beautiful doors and windows, as well as the copper-plates which cover the floor were made during King Mongkut's reign. The wall paintings representing the Universe according to Buddhist Cosmology, and some episodes of the Life

(1) Bowring, *The Kingdom and People of Siam*, Vol. I, pp.316-318.

of Buddha are ancient and were partly restored under Rama III.

The two chambers on the western side of the Bot, were built by King Mongkut. The northern one (Phra Kromanusorn) contains images of Buddha made in remembrance of the Kings of Ayudhyā, and the wall paintings made by In Khong, a famous painter of the middle of the XIX century, represent episodes from the history of the ancient capital.

The southern chamber (Phra Rajabongsanusorn) is very similar, but the images of the Buddha and the wall paintings refer to the present dynasty, especially to the first reign.

The twelve salas surrounding the Bot were made by Rama I., and restored under King Chulalongkorn. They sheltered until quite recently old and interesting remains brought from various countries (Java, Cambodia, etc.), which are now exhibited in the Museum of the Royal Institute.

The bronze image of the Rüsi or hermit, which can be seen between the two western salas, is a fine piece of modern Siamese workmanship.

The small chapel of the south-eastern corner (Phra Gandhararāj) and the high belfry were both built during the reign of King Mongkut.

2) The nucleus of the second or northern group of buildings is the Mahāmandapa, a square pavilion erected by Rama I., on the site of the ancient Library which was destroyed by fire as soon as completed. This pavilion was built for the purpose of keeping the scriptures, and was restored by King Mongkut.

The platform or terrace upon which it rises was enlarged by the same sovereign, who constructed at the same time the other two edifices:

The stūpa called Phra Sri Ratanachetiya was begun in 1855 and completed by King Chulalongkorn, who adorned it with gold-coloured tiles.

The Pantheon was also begun in 1855, originally planned as a special chapel for the Emerald Buddha, but it was afterwards found too small for the purpose of ceremonies. It was renewed in 1903, after its partial destruction by fire. His Majesty King

Rama VI. ordered a few years ago that the statues of His five ancestors be kept in that temple and worshipped on certain dates of the year.

On the northern part of the same terrace is a model of the famous temple of Angkor Wat in Cambodia; this model was begun under King Mongkut and completed under his successor.

On the north-eastern corner of the courtyard, the Library, with its beautiful frontons in carved wood, was built by Rama I. for keeping the sacred books which were too numerous in the Mahāmandapa. One should not fail to see in this Library the magnificent bookcases in lacquered teak-wood inlaid with mother-of-pearl, which were made by order of Rama I. and are considered as the best specimens of that kind of work.

The covered gallery which runs round the temple courtyard, is interesting on account of the wall-paintings which represent episodes from the Ramakien (the Siamese version of the Indian epic Rāmayaṇa). They were made during the reign of Rama I., renewed a first time under Rama III., and again under King Mongkut.

Besides the buildings just enumerated, the precincts of Wat Phra Keo contain several objects of interest: giants, bronze images of lions, elephants, oxen, monkeys of good modern workmanship. The nine towers standing in a row on the eastern side of the temple ground were erected by Rama I. The colours of the glazed tiles with which they are covered are different for each tower and correspond with the colours of the nine planets.

Wat Phra Chetupon.

On the site where Wat Phra Chetupon (*Jetavana*) stands now, was an old temple called Wat Bodhārām (Temple of the sacred fig-tree) and Wat Po is still its popular name.

A new temple was begun in 1793 by Rama I., who installed in the various chapels several old statues from Ayudhyā. Restorations and additions were made by Rama III., and general repairs by King Chulalongkorn.

The plan of the buildings which form Wat Phra Chetupon may

seem somewhat intricate to the visitor who sees them for the first time, but it is in fact very simple. The central chapel or Bot is in the middle of a court-yard enclosed in a square gallery sheltering endless rows of images of Buddha in a sitting posture. Each side of this gallery is interrupted by small chapels containing images of Buddha. Outside this gallery is a kind of cloister, and on the west are four high stūpas and a huge temple containing a colossal image of the reclining Buddha. An outer wall encloses that complex of buildings.

The central chapel (bot) and the galleries with their axial chapels were built during the reign of King Rama I., but the bot was restored by King Rama III. The chief objects of interest in these five chapels are the statues of Buddha which come from various ancient temples.

The central image in the bot comes from Wat Sala Si Na (now Wat Guha Svarga in Thonburi on the western bank of the Menam). The big standing Buddha in the eastern chapel comes from Wat Sri Sarapet, Ayudhyā, and the sitting Buddha in the same building has been brought from Wat Khao Indr, Savanka-lok. The southern chapel contains two sitting images of Buddha, one of which comes from Ayudhyā. A statue of the Buddha sitting on the polycephal snake, which comes from Lopburi, is kept in the western chapel. Both statues in the northern chapel are new.

The four western stupas or Phra Chedis are good specimens of modern Siamese architecture. Originally, there was only one, covered with green tiles, built by Rama I. in the axis of the temple: fragments of an old bronze image from Wat Srisarapet (Ayudhyā) are kept inside. The other two, white and yellow, on each side, were added to the original one by Rama III. The fourth (blue) Phra Chedi was constructed by King Mongkut. These four Phra Chedis are sometimes considered as personifying the first four kings of the present dynasty.

The temple of the reclining Buddha (or the Buddha entering the Nirvāna) was built by Rama III., and is now one of the chief objects of interest in Wat Phra Chetupon.

Wat Sutat.

Wat Benchamabopit.

Wat Sutat.

The construction of Wat Sutat was first undertaken by Rama I., but it was not much advanced when the King died. It was continued by Rama II. and completed under Rama III.'s reign, and partially renewed by King Chulalongkorn.

The temple is essentially composed of two big chapels, one almost square, opening towards the north, and the other, long and narrow, opening towards the east and situated to the south of the first.

The first temple or Vihan is erected on a high terrace, in the centre of a court-yard enclosed in a covered gallery full of sitting Buddhas. The most conspicuous feature of the building is its double roof.

John Crawford visited this building only two years after its construction and his description is worth reading.

"After passing on between two or three miles behind the "palace, we came to a spacious temple, which was commenced by "the present King about two years before, and was not yet finished "This was of the same general form as those I have already "described, but in costliness and magnificence far excelled them. "The doors and window-shutters, and the capitals and pedestals "of the wooden columns, were curiously and laboriously carved al- "most throughout, exhibiting figures of flowers, trees and animals; "this carved work was again richly gilt. The central temple, "which in this case was raised on a very elevated terrace, consisted "of but one chamber, or fane, measuring fifty-eight and a half "English feet in height, seventy-one and a half in length, with a "breadth equal to the height. A single brass statue of Gautama "occupies this noble chamber, for such it unquestionably is. The "image, exclusive of the pedestal, measures, in its sitting posture, "twenty-nine and a quarter feet: from the point of one knee to "that of the other, it is twenty-two feet nine inches. This was an "ancient statue, lately brought down the river from the town "of Sukhodaya by order of the King. The minor images in the "gallery of the quadrangular enclosure of this temple were one "hundred and sixty in number, all of plaster, and most of them

"in an unfinished state."

The great temple (Bot) lying on the south is a long building of 72 m., famous on account of the group of statues which are grouped inside at the base of the altar. There, just below the colossal image of Buddha, is a smaller one presiding over an assembly of his eighty great disciples. These are represented life-size, painted with natural colours, and the sight of this silent council never fails to make a deep impression upon the imagination of the visitor.

Wat Arun.

Wat Arun, whose high tower is the most characteristic monument of Bangkok, was formerly an old temple called Wat Cheng, and this old name is still in use among the people.

While Phra Chao Tāk Sin was residing at Thonburi, he restored the ancient chapel, which was rebuilt again by Rama II. The construction of the great tower dates back to the reigns of Rama II. and Rama III. King Mongkut added some buildings to the original ones, and King Chulalongkorn constructed a new bot, the ancient one having been destroyed by fire.

The chief attraction of Wat Arun is of course the tower or Phra Prang, 74 m. high, from which the visitor enjoys a beautiful view of Bangkok, the Palace and Royal temples, the river, and the harbour.

This tower rises in the centre of a square whose corners are marked by four smaller towers, the plan being thus somewhat similar to that of Angkor Wat's upper terrace. The central tower is supported by a series of basements resting on caryatids of various kinds (angels, giants, monkeys, etc.). The god Indra on his white elephant can be seen in each of the four niches. The lower terrace shows four small pavilions; each of these contains an image of Buddha represented in four different episodes of his life: birth, enlightment, victory over the Evil Spirit, and death.

This group of buildings is entirely covered with fragments of porcelain.

"Viewed from a little distance, they look, as any photo shows, "like a collection of beautifully carved stone pinnacles, but a closer

"view reveals the fact that they are only made of brick and "plaster and covered with divers figures made of broken plates "and saucers. Thousands upon thousands of pieces of cheap china "must have been smashed to bits in order to furnish sufficient "material to decorate this curious structure. It must be admitted "that, though the material is tawdry, the effect is indescribably "wonderful. It is not until one stands close to the work itself that "it is possible to realise that the elaborate designs and the quaint "figures are merely so many pieces of common china. The tallest "of the pagodas, the one in the centre, can be seen from many "points in the city, and by ascending the steps that lead half way "up to the summit, a magnificent view of the capital itself is "gained. The winding river and the broad canals shine like "ribbons of burnished silver: the houses are hidden beneath "masses of foliage, from amongst whose leafy crowns the prettily "coloured roofs and the graceful white spires of many temples "stand out in bold and picturesque relief. At sunset the details "of the structure of the pagodas of Wat Cheng are lost, but "the mass of spires and pinnacles takes on a purple tint which "changes to one of dusky hue, as the light fades slowly from the "sky. The whole edifice is in its way a triumph of decorative "skill of which the people are reasonably proud." (1)

Wat Benchamabopit.

This temple was built by King Chulalongkorn on the ground formerly occupied by Wat Sai Thong. It is a fine example of modern Siamese art, and was constructed with choice materials; Italian marble, Chinese glazed tiles, etc.

The main entrance is through a gate whose fronton in the form of a nāga is inspired by old Khmer art. The handsome iron railing was executed in the Marine workshop.

The two small pavilions on each side of the way to the temple are inspired by ancient Javanese architecture. The northern one shelters a Burmese image of Buddha in white alabaster. In the southern one, the visitor will admire a fine bronze statue of the Buddha sitting on the nāga: this statue was original-

(1) E. Young, *The Kingdom of the Yellow Robe*, p. 302.

ly in Chaiya (Southern Siam) and bears an inscription of the XII century, in Cambodian, recording that it was cast by order of a King whose name is known as that of a King of Malayur (Jambi, in Sumatra).

The bot or chapel in white marble, covered with a roof made of red glazed tiles, is well proportioned and its internal decoration is very sober. The big image of Buddha inside is an exact reproduction of the famous Phra Jinarāj in Pitsanulok, which is considered one of the best statues of Buddha ever made in Siam.

Behind the chapel, a kind of cloister contains in its covered galleries an extremely interesting collection of images of Buddha of various origins. All the types which are known in Siam are represented in that unique collection. Besides, there are Indian, Burmese, Japanese specimens, either original or copies. Some are quite modern and display very good workmanship. Especially worth seeing are the two walking Buddhas from Sukhodaya, the first capital of Siam, which are just in the middle of the western gallery.

Among the other objects of interest in Wat Benchamabopit, are the Vihan Somdet with its fine windows in lacquer and gold, and the bronze figures of Rājasih on each side of the main entrance.

Wat Rajabopit.

Wat Rajabopit dates from the reign of King Mongkut. The plan of the temple reminds one of that of the famous shrine of Phra Pathom (ca. 50 kil. west of Bangkok).

The central building consists of a tall stūpa enclosed by a circular gallery interrupted by four axial chapels, two of these chapels serving as entrances to the inner courtyard which runs round the base of the stūpa.

This group of buildings is entirely covered with glazed tiles and slabs made in China, the effect of which is indescribably wonderful.

The stūpa rises over a vaulted room, in the centre of which is enthroned a big stone image of the Buddha sitting on the Nāga, coming from Lophuri.

The niches in the exterior side of the stūpa contain other

Wat Arun.

images of the Buddha in erect position, coming from various temples.

The northern chapel shows paintings representing episodes from the life of the Buddha.

Behind the temple is a garden containing a collection of small monuments of various styles, such as Indian pavilions, Cambodian towers, Siamese chedis, and even two small pavilions in Gothic style.

Wat Saket and Phu Khao Thong.

Wat Saket lies outside the city-wall. It is one of the most important temples of the capital, and was built during the reign of King Rama I. on the site of an ancient monastery called Wat Sakae. The new temple underwent repairs during King Rama III.'s reign, when the construction of a Phra Chedi of gigantic size was undertaken. But the soft ground could not stand the weight of that enormous mass of bricks. Later on King Mongkut took up his predecessor's work and constructed the stūpa which now rises over the crumbling ruins of the old Phra Chedi.

Wat Saket consists of two buildings, a bot and a vihan, besides extensive priests' quarters. The bot, which stands in the centre of a stone-paved courtyard enclosed by galleries, is built in the ordinary Siamese style. The interior of the bot is, as usual, occupied by a big sitting image of the Buddha, the long sidewalls being covered with frescoes consisting of three rows of kneeling deities. Behind the image of the Buddha, the frescoes represent the tortures of the Buddhist hell.

The square gallery enclosing the bot is interrupted by four entrances, and against its walls in the long corridors are placed 163 sitting and four standing gilt images of the Buddha.

The vihan is of a style similar to that of the bot, though slightly shorter and taller. Inside the vihan and facing north is a gigantic standing image of the Buddha, brought down from Ayudhyā; it measures nine metres in height. The solid teakwood doors of this building are exquisitely carved and richly gilt.

In two of the corners of the courtyard are smaller buildings sheltering rows of Buddhas.

Two winding staircases with low steps lead up to the summit of the Phu Khao Thong or "Golden Mount," which is crowned with a Phra Chedi. The relic enshrined in it is a piece of bone of the Buddha discovered in 1898 in the ruins of the Piprahwa stūpa near the Nepalese border in India.

From the platform on both sides of the Phra Chedi, one can enjoy a unique view over the capital.

Wat Saket is the place for cremations par excellence, and during the dry season, the two pavilions for cremating the dead are in constant use.

The National Library and Museum.

The National Library is now a section of the Royal Institute of Literature, Archæology and Fine Arts established by a Royal Decree of April 19, 1926, but the origin of the Library as a national institution goes back to 1905.

The National Library is divided, in the customary way, into two main departments, viz., Manuscripts and Printed Books.

The department of Manuscripts housed in one of the buildings of the Museum is called the Vajirañāṇa Library, in memory of the name borne by King Mongkut when he was in the priesthood, before his accession to the Throne. The collection of Cambodian Pāli Manuscripts in the Vajirañāṇa Library is certainly the richest in the world. They are kept in magnificent lacquer and gilt bookcases, which are the chief object of interest for passing visitors to be seen in the Library. The collection of Siamese manuscripts is also unrivalled in any other country. It comprises prayer books, religious works and works of literature, history, as well as technical treatises, books on law, and even archives. These manuscripts, which are considered the most interesting for visitors to see, either on account of their artistic value or because they are representative of a special class of work, are exhibited in a series of show-cases. A considerable number of old inscriptions on stone may be seen in the galleries of the Vajirañāṇa Library.

The department of printed books, is known as the Vajirāvudh Library in memory of H. M. King Mahā Vajirāvudh or Rāma VI., whose collection of books was, after his demise, given to the

National Library. This department, which occupies an independent building in front of Wat Mahathat, is divided into two sections, Siamese and Foreign (including European, Chinese, Sanskrit books, etc.). Maps of every description are incorporated in this department, and a special section of pictorial records comprises drawings, pictures, and photographs of eminent persons or of objects of interest.

The public have free access to the Vajirāvudh Library and can make use of several reading-rooms, one of which is specially reserved for the readers of newspapers and magazines, both Siamese and Foreign.

The Museum occupies the Wang Nā or Palace of the Second King. It is a National Museum devoted to Siamese art and archæology, and it is like the National Library, under the management of the Royal Institute.

The first building, facing the entrance gate (Sivamok Hall), is occupied by the Vajirañāṇa Library, where, as already mentioned, Pāli and Siamese manuscripts are kept in beautiful lacquer and gilt bookcases.

The next building, to the right of the former (Buddhaisawan Hall) is a fine work of art by itself, and has been purposely left almost empty, in order that the visitors might enjoy the sight of the beautiful frescoes which adorn its walls. Towards the centre of the hall, the famous image of the Buddha Sihing, which is said to have been cast in Ceylon in remote times, is enthroned on a high altar. Behind this altar, a unique collection of Buddhist votive tablets is exhibited in a number of show-cases.

Behind Buddhaisawan Hall, another large building (Issara Vinichai Hall) is entirely devoted to Bronze. Here the different periods and styles of Siamese art are represented by a considerable number of images and objects of every description: Brahminical gods of Indian or Cambodian workmanship, Siamese images of the Buddha, vessels and domestic utensils, etc.

Between this hall and the next one, an antechamber displays various images and fragments of statues in stone. The statues of bigger size are exhibited in the verandah running round the last

building of the Museum. Here too, the different schools of Siamese art are represented by wonderful pieces, coming from various parts of Siam. There are also good specimens coming from neighbouring countries, such as India and Java.

The last building (Phra Viman) contains in its nine rooms the best productions of modern Siamese art: royal thrones and modes of conveyance, furniture, weapons, dancers' masks, musical instruments, cloth, etc.

The Throne Hall.

At the northern end of Na Phra Lan square, in the centre of which stands the equestrian statue of King Chulalongkorn towers the white marble structure of the Throne Hall with its vaulted dome. When His Majesty the King is in residence the yellow Royal Standard with the red Garuda is seen fluttering on the top of this dome. The official name of the Throne Hall is Phra Tinang Ananta Samakom (the Royal Hall of Grand Assembly).

The Throne Hall is built entirely of white marble; its style being that of Italian Renaissance. During its construction the engineers experienced some difficulties: the subsoil of the ground could not stand the enormous weight of the building which began to sink. Further construction had to be suspended until the building was stabilised by airfilled concrete pontoons. As a matter of fact this huge pile of masonry and marble floats on the soft river mud of which the subsoil of Bangkok is composed.

The building rises in two storeys, the lower one being used on occasions of State Banquets, the upper one being occupied by the Throne Hall proper. The chief entrance is situated in the left wing where a winding marble staircase leads up to the ante-chamber of the upper storey. From this ante-chamber one penetrates into the Throne Room proper. The Throne Room has the shape of a cross with its two long arms pointing north and south, the centre being directly under the lofty dome. On the ceiling of the northern arm is seen a painting representing King Rama I. directing the foundation of Bangkok. On the ceiling of the southern arm is seen King Chulalongkorn abolishing slavery. On the eastern wall is a picture of the coronation of King Rama VI. In the western

Ananda Smagom Throne Hall.

portion of the Throne Room stands the symbol of supreme authority of the Kingdom—the Royal Throne—under the gold rimmed nine-tiered "umbrella". The Throne Room is lighted by tall windows to the north and the south as well as by windows in the dome. During the early morning hours or in the late afternoon, when the rays of the sun penetrate through the windows of the dome, there falls a soft golden stream of light through the Hall enhancing the impression of a splendour which radiates from every nook and corner. At the end of the chamber behind the Throne Room is another staircase which leads down, while a narrow winding staircase leads up to the rotunda of the dome. On the ceiling over this staircase is a picture representing King Mongkut sitting under the golden image of Buddha surrounded by ecclesiastics of various churches symbolizing the declaration of religious liberty in Siam.

CHAPTER IX

BANG PA-IN, AYUDHYA AND LOPBURI

BANG PA-IN.

At a distance of 58 km. from Bangkok along the Northern line of the State Railways is Bang Pa-In. In this locality, a Royal Palace has been a royal country seat from the Ayudhyan period down to the present time.

Originally, there was, at this point of the river, a large island, on which Phra Chao Prasad Thong's family, on the mother's side, used to live and on which he himself is said to have been born. When, therefore, he became King in Ayudhyā (A. D. 1630-1655), he dedicated his family estate to religion and there built a temple which is known by the name of "Wat Chumpon Nikayaram."

He then had a new palace, surrounded by a lake, built in the middle of the island, where he could go and stay from time to time.

Such is the origin of the Bang Pa-In Palace.

This Palace, surrounded by a lake 400 m. long and 40 m. broad, together with the Chumpon Temple, is all that is left of the construction work of Phra Chao Prasad Thong at Bang Pa-In.

The river channel now running past the front of the island owes its origin to the same king. From a canal dug in order to enable the royal barges to gain access to the new Palace, it gradually widened into the main water-course, thus dividing the island into two and causing the former channel at the back of the island to become more and more shallow, so that it is now simply a small canal.

On account of its propinquity to the old capital, the Bang Pa-In Palace was used as a country residence by every monarch who succeeded Phra Chao Prasad Thong on the throne of Ayudhyā. But when the capital was transferred to Bangkok and distance had thus to be taken into account, it ceased to be so used and it was

left unoccupied for more than 80 years. It was only in the fourth reign of the present dynasty (A. D. 1851-1868), when steam launches came to be used as a means of transport in this country, that His Majesty King Mongkut visited Bang Pa-In once more and had a house built there in the precincts of the old Palace, thus making it a royal country seat again.

It was only in the fifth reign (A. D. 1868-1910) that His Majesty King Chulalongkorn, pleased with the place, went there every year and had the Royal Palace constructed as it now stands.

Bang Pa-In is one of the places worth visiting by foreigners coming to Siam, just as the inhabitants of the country continually visit it themselves, for the trip there and back can be effected with convenience by taking a train leaving Bangkok in the morning and, after going over the Palace there, by coming back to the capital in the afternoon of the same day either by rail or, if arrangements are made to that effect, by river, in a motor-boat or a steam launch, as the case may be.

Besides, during the high water season, Bang Pa-In may be made a centre of excursions in various directions either in a rowing boat or in a small motor launch.

Among the many places of interest at Bang Pa-In, is the Royal Palace, for a visit to which, however, permission is required.

It contains five important buildings :—

(1) Phra Thinang (Royal building) Aisvarya Dib Asana, which stands in the middle of the lake and has taken the place of a former building of the same name, that had been erected by Phra Chao Prasad Thong. There is this difference, however, that the old building stood at the edge of the lake on the western side, opposite to the site of the present one.

(2) Phra Thinang Varobhas Biman, situated to the north of the Royal Ladies' Landing Place at the original site of the Pavilion built in the fourth reign. It was originally a building of two stories, the one being used as the King's apartments and the other as a Reception Hall. But when the Court was transferred to another building, the Pavilion, which was then falling into decay, was pulled down and was replaced by a new one consisting of only

one story which now serves as a hall for state ceremonies.

(3) Phra Thinang Udyân Bhumisthir, a wooden building on the eastern edge of the lake, which is generally used for residence during the high water season.

(4) Phra Thinang Vehas Chamrun, a building of Chinese style, lying in the north, where the Court generally resides during the rainy and winter seasons.

(5) Phra Thinang Vidur Dasana, an observatory standing on a little island between Phra Thinang Udyan and Phra Thinang Vehas Chamrun, from which a view of the country may be taken to a considerable distance in all directions.

Besides the Royal Palace, the places of interest at Bang Pa-In include a shrine and two temples.

The shrine, now standing on the edge of the lake excavated under Phra Chao Prasad Thong, was originally only a small shrine set up by the inhabitants of the island, under a big Bodhi tree, in memory of the monarch just named. In the fifth reign, however, an image of the said king was erected and placed in stone Prang which thus replaced the former shrine.

One of the temples, Wat Chumpon Nikayaram, lying at the head of the island by the bridge on the way coming from the Station, was built, as has already been mentioned, by Phra Chao Prasad Thong and restored under the fourth and fifth reigns. The two Phra Chedis in this monastery are considered to be of great beauty.

The other temple, Wat Nivet Dhammapravat, on the outer island, south of the Royal Palace, was built under the fifth reign, in Gothic style on the lines of Christian churches.

AYUDHYĀ.

At a distance of 71 km. from Bangkok, along the Northern line is Ayudhyā. The station is near the river, and there are ferryboats going across to the town which is to be found on the site of the old city.

I. Ayudhyā in Its Capital Days.

The Ayudhyā of to-day, like that of old, is surrounded by

rivers. Only, in the North, the Lopburi River has considerably deviated its course and, therefore, its channel here has become both narrow and shallow and is now merely a canal, bearing the name of "Klong Müang" (the City Canal).

Formerly, when Ayudhyā was the capital, ships, such as trading vessels from abroad, coming up the Menam Chao Phya, had, when they reached the southern outskirts of the city, to stop at a place called "Khanon Luang" (Royal Custom House), situated at "Hua Lem" (the Point), on the eastern bank, below Wat Prôt Sat. There they had to notify the authorities and obtain from them the necessary permission, before they could proceed into the city area.

Beyond the Khanon Luang lay the outskirts of the city and the anchorage for ships and junks engaged in foreign trade.

On the western bank, near the mouth and on the southern side of the Takien Canal, was the Malay Colony, with a Mosque called "Takia" which exists to this day.

North of this lay the Portuguese Colony, with two Catholic Churches.

On the eastern bank, above Koh Rien, was the Japanese Colony.

North of this, in order of succession, came the English, the Dutch and the Chinese Colonies, the last being in the Commune of Suan Plû, near the river bounding the city on that side.

The city itself lay at the junction, and the confluence southwards, of the two rivers, the Menam Chao Phya coming from the West and the River Sak coming from the East.

At the point of bifurcation forming a corner of the city, an important fort was erected with the name of Pom Phejr (the Diamond Fort), remains of which may still be seen in front of the Lord Lieutenant's residence to-day.

When Ayudhyā was first founded by Phra Chao U-Thong, it had as its walls, only a rampart with a stockade of tree-trunks planted on it. It was only in the reign of Somdet Phra Maha Chakrapatti that a wall of brick and mortar, 6 m. high and 3 m. thick, was substituted and a new rampart was constructed behind it. There were also set up 16 forts, 4 water-gates and 32 land

gates.

The southern part of the city was the commercial quarter. It was here that the Chinese, Malay, Indian and European merchants largely settled.

In the North were the Royal Palaces and the various public buildings.

The centre of the town is said to have been little inhabited and was, for the most part, unoccupied. That probably is why it was called "Pā Taung" or "Pā Thān" (Pā = Wilderness). This space had to be kept open, because, in those days, people generally went and settled outside the city in peace time, but, during siege time, they would come and take refuge within its walls.

The river-banks were thickly populated all round the city. The foreigners settled in colonies.

Along the river branching off westwards to the left, below Pom Phejr, were to be found, on the southern bank, the Chinese, the Malay and Annamite Colonies successively. After that, came the Catholic Cathedral called St. Joseph to this day, the site of which was given to the Catholic missionaries by Somdet Phra Narayana, when they first came to the country.

On the northern bank, in the same part of the river, lay the French Factory and a number of residences of the higher officials whose duty it was to deal with the foreigners, such as the residences of Chao Phya Phra Klang and Chao Phya Vijayendra, which lay to the north of the modern distillery.

The house built by Somdet Phra Narayana for the accommodation of the French Ambassador was also located in this quarter.

North of this, above Klong Takien, the river bends northwards.

The Peguan Colony occupied its western bank and on the eastern bank was found the main Landing Place for the western part of the city, called "Pratu Chai" (the Victory Gate), whence there is a road leading to the Royal Palace. Along this road royal letters from foreign monarchs were borne in procession and foreign Ambassadors, on their way to the Royal audience, had also to land here and proceed along the same road.

Further North, lay Wang Lang (the Back Palace), and, north of this still, at the junction of the Menam Chao Phya and the Lopburi River, was the north-western corner of the capital called "Hua Lem" (the Point) to this day.

Here, at the site of the modern barracks, there was an important fort called "Pom Sat Kop."

Here, also, the Menam Chao Phya left the city and ran northwards, while the Lopburi River ran eastwards and formed the northern boundary of Ayudhyā.

On its northern bank, there was a boat-house where the river fighting boats were kept.

On its southern bank, stood the Royal Palace.

The Lopburi River, in its eastward course, continued to form the boundary of the city, until it reached a place called "Hua Raw" (the Weir). The name owes its origin to the fact that, in order to join up with the River Sak which formed the eastern boundary of the capital, a canal was dug from this point, and, in order to prevent the Lopburi River from running exclusively down this channel, a weir was made, which thus gave the name to the place.

Here was the north-eastern corner of the city, and a big fort was built there (at the site of the modern market place), which bore the name of "Pom Mahachai" (the Great Victory Fort).

Here, also, the Lopburi River bends northwards and has, on its eastern bank, an enclosure whence, from the Ayudhyan down to the Bangkok period, the King would watch the capture of wild elephants.

South of this corner lay the Chandrakasem Palace, or, as it is also called, Wang Nā (the Front Palace) now used as the Lord Lieutenant's offices. It was, in some reigns, the residence of the Court and, in other reigns, that of the Heir-Apparent.

South of Chandrakasem Palace, along the western bank of the River Sak, in front of the modern railway station, there was a harbour for the royal ships and junks engaged in foreign trade, which extended down to Bang Kracha, where the River Sak joins the Menam Chao Phya at Pom Phejr, as already mentioned.

Such is the description of Ayudhyā in its capital days.

When once the capital was transferred to Bangkok, people came and settled there more and more and the old city Ayudhyā thus became deserted, but not so the river-banks which are still densely populated, and north of Chandrakasem Palace, there still exists a riverine market which is the biggest of its kind in this country to-day.

II. Palaces.

There are three Palaces in Ayudhyā: (1) Phra Raja Wang Luang (the Royal Palace), (2) Wang Chandrakasem or Wang Nā (the Front Palace), and (3) Wang Lang (the Back Palace) or Wang Suan Luang (the Royal Park), as it is also called.

The Royal Palace.

The Royal Palace, which was the residence of the Court in every reign of the Ayudhyan period, is situated near the city walls on the northern side.

The Lopburi River on this side of the town having become rather shallow, the Palace cannot be conveniently approached by water except during flood time, namely, from August to January. During the dry season, the only convenient access is by land.

There is a road, 2 km. long, leading to it from Chandrakasem Palace.

The Palace itself is, to a great extent, in ruins but the grounds are preserved by the Government and the site of the original Court and many other buildings can still be traced.

This Palace was built by Phra Chao U-Thong at the same time as the capital, i. e. in 1350. The original Court was established near the site of the later one but to the south of it. It was in the reign of Somdet Phra Parama Trailokanâth (1448-1488) that this original site was dedicated to religion and that a temple, known as Wat Phra Sri Sarapet to this day, was built thereon and was thus included in the Palace compound. The Court, on the other hand, was moved to its present site nearer the river.

The works, thus commenced by Somdet Phra Parama Trailokanâth, now include:

(1) Phra Thinang (Royal Building) Suriyat Amarin, the northern building near the River, which replaced the Phra Thinang

Bencharat of Somdet Phra Parama Trailokanâth and was built by Somdet Phra Narayana (1656-1688);

(2) Phra Thinang Sarapet Prasad, the middle building, which was used for State receptions and was built by Somdet Phra Parama Trailokanâth, with stables for white elephants on both sides of it;

(3) Phra Vihân Somdet, the southern building which was used for state ceremonies such as the Coronation, and was built by Phra Chao Prasad Thong (1630-1655) in place of the Phra Thinang Mangalabhisek of Somdet Phra Parama Trailokanâth that had been burnt down. In the Ayudhyan period, it was commonly called "Prasad Thong".

(4) Phra Thinang Chakrapat Baijayant which stands near the lawn in front of the Palace on the eastern side and was used for watching military drill. It was built by Phra Chao Prasad Thong;

(5) Phra Thinang Trimukh, behind Phra Tinang Sarapet Prasad. The original building is supposed to have been a garden pavilion but it is not certain when it was built. Its foundations were only discovered in the fifth reign by Phya Boran, Vice-president of the Royal Institute in charge of the Archæological Service. It was on these foundations that His Majesty King Chulalongkorn had an open pavilion constructed according to the original plan. It is still the residence of the Court during the royal visit to Ayudhyā;

(6) Phra Thinang Banyong Ratanat, which stands in the middle of the lake at the back of the Palace and was built by Somdet Phra Petracha (1688-1703). It is also called "Phra Thinang Thay Sra" (the Royal Building at the back of the lake);

(7) Phra Thinang Song Pün, the building furthest back on the western side, which, at first, was probably used for tournament exercises but which, after the Court was transferred to Phra Thinang Banyong Ratanat, came to be used as a reception hall, on account of its nearness;

(8) The Temple called "Wat Phra Sri Sarapet", the most important of all in Ayudhyā, which is to be found in the southern

part of the Palace and the history of which will be given below in the section dealing with temples;

(9) The outer Palace walls, south of this temple, which were constructed on the lines of the fortified walls, and part of which can still be seen intact to-day;

(10) A great cast Image of the Buddha sitting, known as "Phra Mangala Bopit," which is placed in a Vihāra outside the Palace walls, on the south. No record is available as to when it was cast. All that is known is that its original location was outside the Palace, on the eastern side, and that it was transferred to its present site in 1603 by Somdet Phra Chao Song Tham;

(11) The Royal Esplanade in front and east of this Vihāra whereon was built, as occasion required, the Meru (Cremation Stand) for the cremation of the royal remains of Kings and of the more important members of the Royal Family.

Chandrakasem Palace.

This Palace, now used as Government offices, was originally in the Ayudhyan period a Royal Palace. Somdet Phra Naresvara had it built in 1577, when he was still Heir-Apparent and Governor of Bisnulok, in order that he might have a place to stay in when he came to visit his royal father at Ayudhyā. He gave it the name of "Chandrakasem Palace," because it stood in front of the Royal Palace.

He made it his quarters during the struggle to throw off Peguan suzerainty and to win back independence for the Siamese nation. And even after he had come to the throne, he continued to reside there for many a year before he moved into the Royal Palace.

Two kings that came after him, namely, Somdet Phra Narayana and Somdet Phra Chao Boroma Koth (1732-1758), stayed there for a long time and added to the works there.

During the Ayudhyan period, Chandrakasem Palace was either the residence of the Court or that of the Heir-Apparent. But when Ayudhyā was lost to the enemy the last time, the Palace was completely burnt down, and it was left in ruins until the fourth reign of the present dynasty (1851-1868), when His

Majesty King Mongkut had a portion of the old Palace restored in order that he might stay there during his visits to Ayudhyā. It continued to be used for this purpose until the fifth reign, when the Bang Pa-In Palace was substituted in this connection. It was then converted into Government offices for the Circle of Ayudhyā.

Most of the buildings that are there now were constructed in the fourth reign. Some of them were new creations while others followed the original plan of the old Palace.

A description of the more important of these is given hereafter:—

(1) The gate in the Palace walls was made in the fourth reign.

(2) The Chaturamukh Pavilion, with wooden walls, standing in the Courtyard, near the Eastern Palace Gate, was built in the fourth reign for royal residence but it has now been turned into a Museum in which, as also in places arranged for the purpose near the Palace walls all round the Pavilion, are exhibited to the public the antiquities of Ayudhyā which have been collected by Phya Boran.

(3) Phra Thinang Biman Rathya, a group of buildings built in the fourth reign, along the lines of the Ayudhyan foundations, was originally intended for royal residence, but it was not completed in time in the fourth reign and, in the fifth reign, it was converted into Government offices, namely, the Lord Lieutenant's offices of to-day.

(4) Phra Thinang Bisay Sallakh, an observatory on the western border of the Palace, was originally built by Somdet Phra Narayana but had, at one time, fallen into decay and had to be restored by His Majesty King Mongkut who gave it its present name.

This is all that is left of importance in Chandrakasem Palace.

Outside the Palace, in the North, there is a prison for the Circle of Ayudhyā as well as a market-place, while, in the South, there are public buildings such as the Law Court, the Post and Telegraph Office, the Land Registration Office and the Gendar-

merie Station.

Wang Lang.

Wang Lang is near the city walls on the western side (where the barracks now are). At first it was merely a Park with, perhaps, a lodge in it. It was made into a Palace at the same time as the Chandrakasem Palace in the reign of Somdet Phra Maha Thammaraja (1569-1590) and became the residence of Somdet Phra Ekatosarot who was his youngest son. Its name "Wang Lang" is derived from the fact that it lies at the back of the Royal Palace, just as Chandrakasem Palace standing in front of the said Palace is also called "Wang Na." There is a difference, however, in that, unlike the Chandrakasem Palace, it never was the residence of the Court but only that of the members of the Royal House. There is, therefore, nothing of architectural importance to record in this Palace.

Tamnak Phra Nakhon Luang.

This royal rest-house lay on the eastern bank of the River Sak, north of Chandrakasem Palace. Here the King used to take shelter from the heat when he was on his way to Phra Puttha-bad (the Buddha's Foot-Print) and spend the night when he was on his way to Lopburi. It was probably first set up in the reign of Somdet Phra Chao Song Tham (1620-1628) when the Foot-Print was discovered, but it was not made of brick and mortar until the reign of Somdet Phra Chao Prasad Thong, who also built a temple north of the Tamnak, near the river, which exists to this day.

It came to be called "Phra Nakhon Luang" in this way After quelling a Cambodian revolt which remained unrepressed under Somdet Phra Chao Song Tham, Somdet Phra Chao Prasad Thong, in order to enhance his prestige, had a Prasad (Mansion) constructed behind the Tamnak, on the model of, but on a smaller scale than, the Prasad of the same name in Cambodia. It was from the latter, therefore, that the name was taken.

The Tamnak is now in ruins but traces are left of the original foundations. The Prasad, however, has been converted into a temple and is kept in good condition by the monks.

Phra Mongolbopitr, Ayudhya.

III. Temples.

There are, in Ayudhyā, innumerable temples of various sizes, and so mention will only be made here of the more important ones possessing an historical or other interest.

(1) Wat Phra Sri Sarapet is a temple in the Royal Palace, like the Temple of the Emerald Buddha in Bangkok. It was originally a Prasad built by Phra Chao U-Thong when he founded the capital but it was converted into a temple by Somdet Phra Parama Trailokanath, who had transferred the Court to another building nearer to the river. In all probability, this temple, known as "Buddhāvās", was at first used for State ceremonies such as the Drinking of the Water of Allegiance and other religious ceremonies. Later on however, namely, in 1492, Somdet Phra Ramadhipati II., son of Somdet Phra Parama Trailokanath, built within its grounds a big Chedi (relic-shrine), in order to deposit therein the Ashes of his royal father and also those of Somdet Phra Boroma Raja, his elder royal brother. And in 1500 he further caused to be cast a gilt Image of the Buddha standing, 16 m. high, to which he gave the name of "Phra Sri Sarapet", after which, in turn, the temple was called.

This temple was also the depository of the most important Buddha images, whether those that were cast in subsequent reigns, such as Phra Lokanath which is now in the Eastern Vihan in Wat Po, or those that were obtained from elsewhere, such as Phra Buddha Sihing, now in the Museum, which was brought down from Chiengmai, after the capture of that town by Somdet Phra Narayana.

Here also were deposited the ashes of kings and members of the Royal House during the Ayudhyan period.

This temple, therefore, is the most important of all in Ayudhyā and has been recently excavated by the Archæological Service.

(2) Wat Putthaisawan near the river, on the bank opposite to the city in the South, was built by Phra Chao U-Thong in 1353 at a place called "Wieng Lek," i. e. the temporary residence of that king before the capital was built.

The object of interest here is the great Phra Prang (a relic-shrine with a blunt angular spire).

(3) Wat Phra Chao Panan Choeng is in the South of the town near the river. It is not known who built it. There is, however, a record giving the date of its foundation as 1324, 26 years before the foundation of Ayudhyā by Phra Chao U-Thong. It used to contain a large and important image of the Buddha sitting in the contemplative posture and it is from this fact that it has derived its name, which means the temple of the Buddha sitting in the contemplative posture.

The image that is there now, however, was cast by Somdet Phra Naresvara and is still in perfect condition.

This image, together with the Phra Vihan, is an object of widespread veneration.

LOPBURI.

Historical Sketch.

Lopburi is a very old city and, as such, had no less than two golden periods, one in antiquity and one of more recent date. The town is full of old temples and other interesting ruins, and is therefore well worth visiting, more especially as it is quite near to Bangkok—in fact only four hours travel by the Northern Railway. The city lies on a branch of the Menam Chao Phya, called Menam Lopburi, 120 kilometres from the sea, and is built upon a sort of tongue of higher land stretching out to the Menam from the hills to the East of the town: to S. W. and N. it is surrounded by very low lying land, usually inundated during the rainy season.

The name of the town was in the olden times *Lavō*. It was later on altered to Lopburi and according to the legendary accounts of the Northern Chronicles, was founded by King Kalavarnadis called the black Tissa from *Taksila*, A. D. 468.

The date may seem ambiguous, but it must be remembered that there has been found in Lopburi (by H. E. Phya Boran, the former Viceroy of Ayudhyā) an engraved stonepillar which, though bearing no date, by the archaic form of the letters points to a date not later than the VI or VII century A. D., thereby confirm-

ing the approximate correctness of the date given by the Northern Chronicles. The language of the inscription is Mon.

The Nang Chāma Dēvi chronicle tells us that in A. D. 654 a king or emperor of Lavō sent his daughter, named Nang Chāma Dēvi, to govern *Haribhunjai*, the present Lampūn, by which we see that the sway of Lopburi at that time stretched far up to the North.

During the second half of the X century, Lavō was conquered by a King of Nagor Sridharmaraj (Ligor), whose son became King of Cambodia and incorporated the lower Menam Chao Phya valley into the Khmer empire. According to an inscription in Cambodian engraved under a bas-relief representing the chief of Lavō leading his troops (to be seen in the galleries of Angkor Wat), it appears that at this time, probably about A. D. 1150, Lopburi like the rest of Siam was still under Cambodian overlordship. We know that Sukhodaya, as probably Lopburi also, cast off the Cambodian yoke about A. D. 1256 or 1257, and Lopburi was finally conquered by Phra Chao U-Thong shortly before he made Ayudhyā his capital in A. D. 1350.

When Phra Chao U-Thong founded Ayudhyā, he appointed his son Phra Ramesvara to be ruler of Lopburi. The next time we hear something about Lopburi is during the first war between Burma and Siam, when it was conquered by the Burmese army in 1563. Five years later it was again taken by the Burmese, but the sojourn in this Siamese Capua proved too much for the Burmese soldiers, who were surprised and badly beaten by the King of Vieng Chan, the latter having hurried to the assistance of the King of Siam, besieged in his capital by the Burmese. Notwithstanding this victory, the Lāo King was soon after defeated by the Burmese and had to retire to his own country; as a result of which Ayudhyā was forced to surrender to the King of Burma. In 1602 Siam's famous warrior, King Phra Naresvara, went to stay at Lopburi for his pleasure, an example to be followed by one of his successors, the well known King Phra Narayana. We do not intend here to relate in detail the events concerning Phra Narayana's Reign—how the Greek

adventurer, the talented Constantin Phaulkon, won the confidence and favour of the King to such an extent that he was raised to the rank of Chao Phya Vichayen, how he constructed palaces and forts for the King and especially in Lopburi, which place King Narayana had chosen for his summer residence since 1657, and further how Phaulkon induced the King to open diplomatic intercourse with France, sending Siamese Ambassadors to Louis XIV.'s court and receiving French Ambassadors in Ayudhyā and Lopburi; and finally how Phaulkon with his excessive zeal for converting the King to Christianity was together with his master overthrown by the envious noblemen, the leader of whom was Phra Petracha, and lost his life in 1688.

After the revolution in 1688 Lopburi fell into oblivion and its architectural splendours became mere ruins overgrown with jungle, in which state they remained for more than 150 years, until King Mongkut, the grandfather of His present Majesty, chose this as an occasional summer residence and repaired the walls of the citadal and one of the palaces (the wat-like Chandrabhisan). Since then the town has revived and is now quite prosperous in a small way, situated as it is in one of Siam's most fertile regions.

The Monuments of Lopburi.

We will now start our sight-seeing,—beginning with the big temple lying close to the railway station and a little S. W. of the same. It is called *Wat Mahathadu*. Inside the brickwalls built in a spacious square, stands in the centre a tall "Prang" built of laterite. It is approached from the East by a steep stair-case which leads up to a new empty room where in pre-Buddhist days an image of a Brahmin god was placed. The building is unmistakably Cambodian work. Two other towers are seen to the right and left of the "Prang," which is itself quite a fine example of the architectural skill of the creators of that stupendous and wonderful Angkor Wat. The other buildings inside the walls are of a later date, and distinctly Tai; so is the big Vihan adjoining the Prang to the east, also a Bote south of the Vihan and another building serving as a sort of entrance lying to

the North of the Prang, and so finally are the rows of Phrachedis and Prangs inside the wall, all now in deplorable ruins. Inside the Bote are a great many stone statues of the Buddha sitting on the Nāga, most of them of good workmanship. This temple has been recently excavated by the Archæological Service.

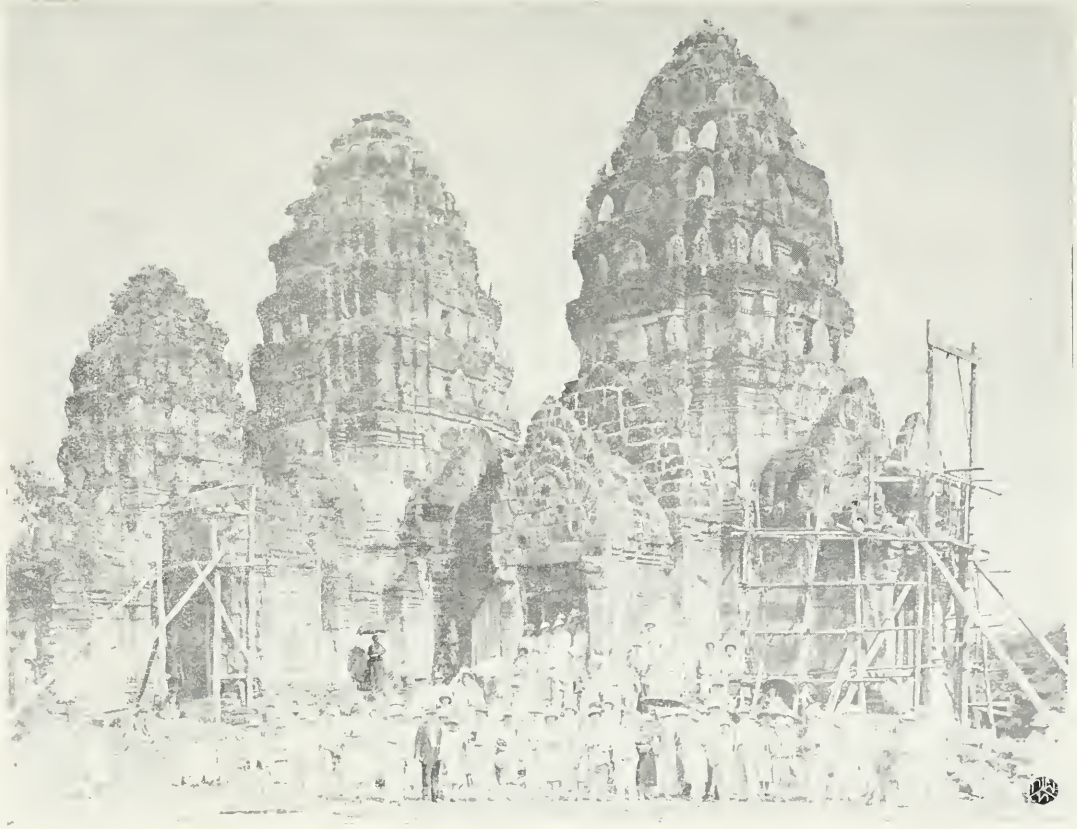
From this temple we follow the railway going North and, a few minutes after, we stop at a temple lying to the East of the line called *Nakhon Kosa*. It consists of a brick "Prang" in Cambodian style, but was perhaps built by the Tai. Its chamber opens to the East and on the three other sides are niches, two of which are empty, the third one containing a standing Buddha. Just behind this "Prang", which itself is built on the top of a small eminence, the ground rises rather abruptly in the shape of a tall cubic hill, at the foot of which are the ruins of a small temple. The top of the hill is crowned with another building: probably it was another Prang.

We continue our walk and shortly after arrive at what is called *Sān Sung* (or Sān Phra Kal), *i. e.* the high sanctuary; it consists of a big pile of sandstone blocks and blocks made of this peculiar cement called "Silaleng" (laterite) and is built in the form of a pyramid with two terraces. On the lower one, which is approached by a staircase from the West, an ugly, modern, iron-roofed shed has been erected, and in this, placed on an altar, are to be seen a standing image of a four armed Vishnu or Narai, having on his right hand a smaller image of the goddess Lakshmi; a fine female statue without a head is leaning to the wall behind the statue of Lakshmi. It is a curious fact that the Chinese especially adore and worship these statues, probably from a business instinct thinking it best to keep on good terms with the local genii! Behind this "Sān Chao" we mount some more steps and arrive on the top of the pyramid, where we find another brick building also of recent origin, inside which is seen a stone "soma-sūtra", *i. e.*, the stone on and in which the image of the god was placed. In the stone is cut a channel running round the sides of it and ending in an outlet behind the image. This was made to

get rid of the soma or sacrificial drink which the Bhramins poured out in front of the god during the act of worship, A sculpture representing Vishnu lying on the snake Ananta is also kept in this building. A mighty banyan tree grows close to the pyramid and in its leafy crown dwells a joyous company of monkeys, which are quite tame and will come down to accept fruit out of your hands.

Not far from Sān Sung, on the other side of the railway line, lies the finest of all the temples: *Phra Prang Sam Yot.* This temple consists of three towers all built of sandstone and distinctly in Cambodian style, but they are all connected with each other by galleries; the towers have doors to all four sides and are on the outside adorned with the sculptures typical of such buildings: as for instance, over the western door of the central tower the god Indra sitting on the three-headed elephant and on the corners of the terraced superstructures, the sculptures of many Rishis (hermits). The snakes motive so commonly seen over all Cambodian temple doors does not lack here too, but it is more or less destroyed, the sculptured stones having fallen down for the most part. The interior of the temple is a real treasury of sitting or standing images mostly of Buddha. It is possible that some of the standing ones are representations of disciples. Some are placed in the windows of the galleries and throughout the longitudinal axis of the temple you see them sitting or standing everywhere, some hidden in niches and some placed in the centre of the towers. All the statues are of sandstone, many covered with a layer of lacquer upon which formerly the gold-leaf was stuck. On the Eastern side of the temple is a brick building which quite spoils the "ensemble" of the temple. This building dates from Phra Narayana's time.

Leaving this temple we strike westwards and are soon in the centre of the old town, where is standing another monument: three brick built towers called *Tevasathan* or *Phra Prang Khēk.* The construction of the monument seems to have been begun by the Cambodians and finished by the Tai; the towers are quite well preserved. Of two smaller, square-formed build-



Phra Prang Sam Yot, Lopburi.

ings lying in front, *i. e.*, East and S. E. of the towers, the last one is in the best condition having only lost its roof.

Continuing towards the west we reach *Phaulkon's house* or palace consisting of 5 buildings constructed in a curious style, all rather narrow and with windows the form of which reminds one of the Saracenic style. Here resided the mighty minister with his Japanese wife and here he no doubt entertained the French noblemen, officers and also priests. One of the buildings farthest west was in fact a chapel.

From Phaulkon's palace we turn to the left to reach the citadel and King Narayana's palace, but before entering the citadel let us turn to the right and stop just for a moment to visit:

Wat Sao Tong Thong where a particular octogonal Prachedi attracts one's attention. In its whitewashed niches are seen golden figures of standing, walking or sitting Buddhas, which though undoubtedly of recent origin are still worth looking at. The Vihan dates, in its original form, from the time of the foundation of Ayudhyā (A. D. 1350).

At the outskirts of the temple grounds lie two buildings, one called Tük Pichu, the other Tük Khochasarn. According to the views of Prince Damrong the first name stands for the French word *bijou*, *i. e.*, small, while the other is derived from Khorassan, a Persian province; these buildings being occupied respectively by some French residents and the Persian ambassador to the court of Phra Narayana.

The citadel is surrounded by brick walls built in an oblong square and divided into three courtyards; there are eight gates, two on each face. Each of the four corners of the citadal is built like a bastion and there are still traces of openings for the guns placed behind the walls. We enter the citadel by the N. E. gate, inside which is the house of the Governor; we are now in the first and lowest courtyard. Just opposite the Governor's house, *i. e.*, South, are the ruins of several two-storied houses, which served as magazins for the King. They are appropriately called "Phra Klang," one of the buildings being of more than ordinary interest by reason of the immense thickness of its walls and the remains of

pipes debouching from the brickwork. This is the famous water reservoir, where the water led through under-ground pipes from Tale Chubsorn about 4 kilometres N. East of the town, was stored, and from here directed to the fountains and the bathing basins reserved for King Narayana. A road between the Governor's house and the "Klang" leads through a tall gate up and into the inner courtyard on both sides of which were built stables for elephants. We do not, however, enter by this gate but turn to the left, still keeping inside the outer courtyard where we examine the ruins of the houses destined for the King's guests, also dungeons and fountains, whereafter we enter the second courtyard through a gate in the Southern part of the outer courtyard and see here the few remains left of King Narayana's personal apartment called Phra Thinang Sutthaisawan. From this courtyard we walk up the curious sloping approach to a gate leading into the third and upper courtyard. We have at once on our left hand the ruins of the audience hall called Phra Thinang Thanya Maha Prasat, a tall building now without a roof, the interior is not big. At the end of the hall is seen the window behind which the royal throne was placed and in which the King appeared when he received ambassadors in audience. According to Gervaise the walls of the hall were covered with large fine mirrors brought out from France and the building itself was covered with a pyramidical roof probably something like that of Dusit Maha Prasat in the Bangkok's palace. To the left of the audience hall are still two buildings more; namely, the offices of the changvad and a wat-like one called *Chandrabhisan*, built by King Mongkut, where a Museum has been recently installed. Behind these buildings were and are still to-day two long rows of buildings where, in King Narayana's time his harem stayed. Standing in front of the Government offices one sees a gate in the Northern wall. This is *Pratu Vichayen*, and here was Phaulkon arrested by Phra Petracha's soldiers, later on to be led out into the forest at Tale Chubsorn and killed there. A lot of small niches will be observed in the gate buildings and in other places too; these were according to Gervaise, ornamented with China vases on big days and also used for placing

lamps when illuminating the palace. The fortifications were no doubt constructed by a French military engineer, who probably also built the palaces and other buildings, which all look rather uncomfortably narrow and dark.

The town is surrounded on three sides by high earthern walls and broad moats. Besides this there is an interior moat, which probably represents the old Cambodian town boundary.

CHAPTER X

ALONG THE RAILWAY LINES

The tourist visitor to Siam finds, usually to his great surprise, that he can travel from one end of the country to the other in trains which are unsurpassed in comfort, convenience and smooth riding. The Royal State Railways of Siam, owned and operated by the Government, offers this luxury in oriental travel. It justly merits the opinion of the late Lord Northcliffe who wrote in the *Daily Mail*: "My principal recollections of the Siamese Railways are of wonderful smoothness of running, of beautiful sceneries and of the most peaceful and comfortable train journey I can remember."

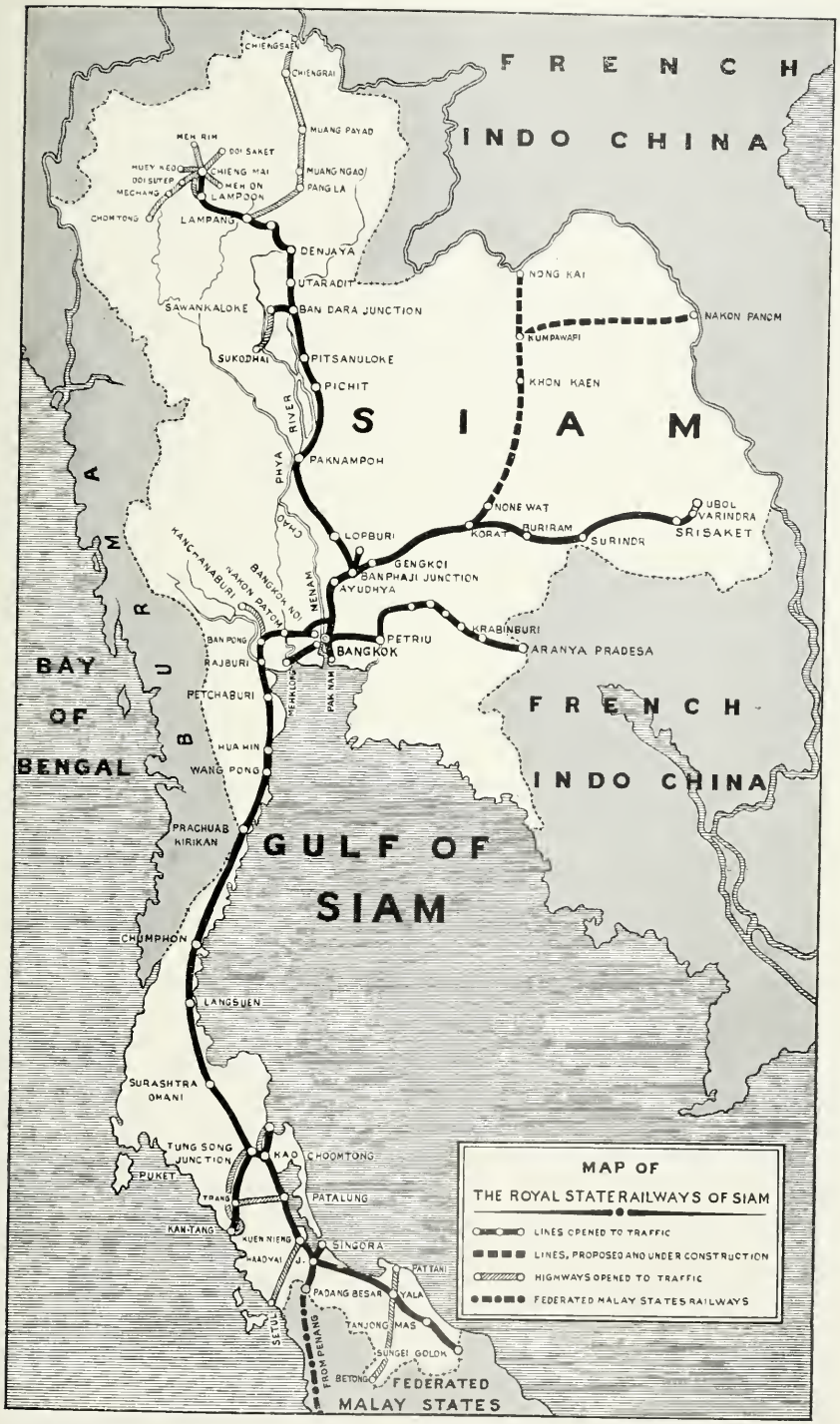
The purpose of this chapter is none other than to acquaint the traveller with the Country along the railway lines and to furnish him with a background of information for the appreciation of his railway journey through Siam.

The construction of the Royal State Railways of Siam was begun only some 38 years ago. In 1892, King Chulalongkorn cut the first turf of the line from Bangkok to Ayudhya, which was carried on in the north-easterly direction to Korat, a total length of 264 km. The system now comprises some 3,000 kilometres of line, centring on Bangkok. One line runs practically due north from Bangkok on the east bank of the Chao Phya River to Chiengmai, a distance of 751 km. At Ban Dara Junction (Km. 458) a branch, 30 kilometres in length, diverges west to Svargalok, and at Ban Bhaji Junction (Km. 90) the line branches to the North-East through Korat to Ubol, which is 575 km. away from the Capital. Another line runs due east for 255 km. from Bangkok to

Note :—

(Km....) after place name on the Southern Lines means distance in kilometres from Bangkok Noi.

(Km....) after place name on the Northern, North-eastern and Eastern Lines means distance in kilometres from Bangkok.


FRENCH
INDO CHINA
CHIENGSAN
CHIENGRAI
MEH RIM
DOI SAKET
MUANG PAYAO
HUEY KEO
CHIENG MAI
DOI SUTEP
MUANG NGAO
MECHANG
MEH ON
PANG LA
LAMPOON
CHOMTONG
LAMPANG
DENJAYA
UTARADIT
NONG KAI
SAWANKALOKE
BAN DARA JUNCTION
NAKON PANOM
KUMPAWAPI
SUKODHAI
PITSANULOKE
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UBOL
VARINDRA
LOPBURI
KORAT
BURIRAM
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BANGKOK NOI
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GENGKOI
BANPHAJI JUNCTION
AYUDHYA
MENAM
KRABINBURI
PETRIU
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PAK NAM
FRENCH
INDO CHINA
HUA HIN
WANG PONG
PRACHUAB
KIRIKAN
GULF OF
SIAM
CHUMPHON
LANGSUEN
SURASHTRA
OMANI
TUNG SONG
JUNCTION
HAD CHOOMTONG
PUKET
TRANG
PATALUNG
KAN-TANG
KUEN NIENG
SINGORA
HAADYAI J.
PATTANI
PADANG BESAR
YALA
SETUL
TANJONG MAS
FRONTIER
PENANG
SUNGEI GOLOK
BETONG
FEDERATED
MALAY STATES
MAP OF
THE ROYAL STATE RAILWAYS OF SIAM
LINES OPENED TO TRAFFIC
LINES, PROPOSED AND UNDER CONSTRUCTION
HIGHWAYS OPENED TO TRAFFIC
FEDERATED MALAY STATES RAILWAYS

Aranya Prades on the Cambodian frontier.

The Southern Railway Line starts from Bangkok and Bangkok Noi and continues 989 km. southward along the Peninsula to Padang Besar, the joint station of the Royal State Railways of Siam and Federated Malay States Railways. From Haad Yai Junction (Km. 928.52) a line diverges south to connect with the east coast system of the Federated Malay States Railways at Sungei Golok, 1142.99 km. from Bangkok, while a branch 30 km. in length runs out from Haad Yai to Singora on the East. Two other branches extend from this main line, one from Khao Chum Tong Junction to Nagor Sridharmaraj, 34 km., and the other from Tung Song Junction to Kantang, 93 km.

A glance at the Railway map of Siam will suffice to reveal that the Southern Line of the Royal State Railways is responsible for the opening up of the fertile regions of Southern Siam and also for joining Bangkok with the world's great mail and trade routes.

By arrangement with the Federated Malay States Railways, the Royal State Railways of Siam run their wagon-lit express between Bangkok and Prai (Penang) twice weekly. A passenger on an east bound steamer from Europe or India thus disembarks at Penang, catches the Siamese express at Prai and within 31 hours reaches Bangkok, the Capital of Siam.

The express train from Prai to Bangkok, commonly termed "International Express" is well-known for its modern equipment and its efficient service. "The day and night coaches, as they are termed," remarked a writer, "are cabin sleepers with large, fully equipped cabins containing wonderfully comfortable beds, Mosquito nets and electric fans are a regular part of the equipment. The dining cars serve unusually good food and the Siamese attendants present a neat and pleasing appearance. They are very intelligent and polite and seem anxious to do everything possible to add to the convenience of the traveller".

From Prai the International Express travels for four and a half hours over the rails of the Federated Malay States Railways, passing through Province Wellesley, Kedah and Perlis. Province

Wellesley is highly prosperous: rice, coconuts and rubber are cultivated everywhere. Kedah and Perlis are two of the Unfederated Malay States. Perlis is geographically a part of Kedah. Like Kedah, the country is alluvial plain devoted to the cultivation of rice. A little tin is exported, and caves of limestone hills are rich in guano.

The Malay State of Kedah lies on the west coast of the Peninsula with an area of 3,648 square miles and a population of 338,558. The International Express enters Kedah within one hour and a half from Prai and reaches Alor Star two hours afterward.

South Kedah is populated with Malays, who plant rice along the coast, and Chinese, who plant tapioca, coconuts and rubber in the land behind the coastal strip, while in the northern section of the State, the population consists chiefly of Malay cultivators of rice. Much rice is being exported from Kedah through Penang.

Alor Star, the Capital of Kedah, is a city of 11,596 people. The railway line passes through Alor Star on its way to Siam. There is also a metalled road which runs from Prai through Alor Star to Siam. By this road it is possible to motor from Prai (Penang) to Haad Yai, the important railway junction in Siam, in about four hours.

All along the railway line, there are numerous rubber estates and paddy fields. They are the wealth of British Malaya. Scenes change slowly and within two hours after leaving Alor Star, the train pulls in at Padang Besar, the joint station of the two Railways where a long halt is made to enable passengers to change currencies and the Passport and Custom Officials to finish their duties.

The railway station at **Padang Besar** is situated in the territory of the State of Perlis, 1.08 km. beyond the Siamese frontier. The station is jointly maintained by both Railways. The station master is an official of the Federated Malay State Railways while the chief clerk is an official of the Royal State Railways of Siam. This arrangement is just the reverse at Sungei Golok where there is another joint station.

From Padang Besar station, there is a road leading to the

main highway which joins Prai with Haad Yai. The district of Padang Besar is the home of the sladang and deers are plentiful.

Shortly after leaving Padang Besar (Km. 973 84), the train crosses the frontier into Siam and Haad Yai Junction (Km. 928.54) is reached within an hour. From Padang Besar to Haad Yai, the scenery changes slowly. The presence of rubber plantations is still noticeable.

Haad Yai is an important centre of railway activities. From here two other railway lines branch off to Kelantan and Singora. Kelantan is another Malay State on the east coast of the Peninsula while Singora is an important Siamese town, also on the east coast.

Haad Yai itself is an important town. It is developing quite rapidly, not only because it is an important railway centre, but also because it is a convenient stepping off place for those who engage in tin mining in the district. The town has grown enormously during the last few years. New buildings are coming up on all sides, roads are being widened and improved and living conditions are being rapidly raised.

There is a railway resthouse at Haad Yai.

From Haad Yai, there is an asphalt road leading to the town of Singora, 30 km. away. The road is extremely well maintained and runs parallel to the railway in many places. Both the rail and the road pass through a beautiful and slightly hilly country.

Singora is a town of about 19,000 population and is the capital city of the Circle of Nagor Sridharmaraj. The town is said to have been found by the Spaniards who landed there about 350 years ago, and struck by the natural beauty of the place named it Senora di Singgora after a town in Spain.

Singora proper is situated on the mouth of the Talé Sap, an inland sea, on the east coast of the Peninsula, accessible to all sea-going steamers. With this favourable location, Singora has become an important port through which passes the trade from the neighbouring towns and all towns on the Inland Sea. All coastwise steamers call to load and discharge cargoes at Singora.

Singora's principal products are coconuts, wolfram, rice and tin. Singora's hand-weaved cloth is wellknown throughout Siam.

Singora has many attractions as a holiday resort. There is a railway resthouse near the station and on the hill there is an excellent hotel, overlooking the whole town with the Inland Sea as background. This hotel is called Khao Noi, named after the hill on which it is situated.

As an old town, Singora has many temples and monuments and many traditions and manners which are peculiar to Southern Siam. Fairs and carnivals are held at frequent intervals and bull fighting forms one of the most popular entertainments for the populace.

Singora has a fine hospital, several schools for secondary education and a landing ground for aeroplanes.

From Haad Yai there is another branch of the railway, 215 km. long, which runs to Sungei Golok, the station adjoining Kelantan. A glance at the map reveals that this line also links Pattani, another important Siamese Malay town, with the main trunk line of the Railways. Pattani is 25 km. by road from the railway station of Koke Bodhi, which in turn is 81 km. from Haad Yai. Between Haad Yai and Koke Bodhi, the country is sparsely populated; the railway line passes through miles and miles of meadow lands studded with little groves and isolated trees which break the monotony of the grass and enhance the beauty of the plain like patches of flower patterns on a green carpet. Cattle are seen grazing on this plain in large numbers. In the neighbourhood of Kuen Chong, Wat Kuen Meed, Chanong and Tepah stations, there are tin mining districts. At Kuen Chong, the tin mining area is quite close up to the station.

In 1929, Koke Bodhi and Pattani were the important centres for astronomers from many parts of the world who came to observe the totality of the Solar Eclipse on May 9th.

Pattani has a population of over 130,000, mostly Malays. The town was settled by Portuguese merchants as early as 1516. In 1536, there were over 300 Europeans in Pattani. Owing to its easy access to the sea, these traders used the town as their emporium for many years until trade in Ayudhya began to flourish and attracted practically all these traders away from Pattani.

From Pattani, there is a highway which connects the several

other towns on the coast with the railway line.

Southward from Koke Bodhi, the next station is Na Pradoo (Km. 1016.73), where there is a road leading to an important tin mining centre worked by the Pattani Consolidated Alluvial Tin, Ltd., with a capital of over Ticals 1,700,000. The method of working is by dredging and sluicing. This company owns one of the largest dredgers in Siam.

One hour from Koke Bodhi is the station of Yala (Km. 1038.69) where there is another highway leading northward to Pattani and southward to Betong, the southernmost frontier of Siam, adjoining the Malay State of Perak. The railway line between Koke Bodhi and Yala passes through several rubber plantations. In fact all along this branch of the railway, rubber is the chief industry and can be seen everywhere.

Yala is a town of some 50,000 population. There are many interesting caves and monuments in the neighbourhood of the station.

Two hours further from Yala is another important station, Tanjong Mas (Km. 1099.53). Here the State highway, which begins at Koke Bodhi and passes through Pattani and other towns on the coast, joins the railway.

From Tanjong Mas to Sungei Golok, it takes less than one hour and a half. All along the railway line durian trees (Durio zibethinus) are abundant. Near to Bukit, two stations south of Tanjong Mas, there is a large plantation of durian stretching for miles along the track. Durian is the king of tropical fruits. Its malodorous content to some is the very food of heaven, while to others is intolerable by reason of its odour.

Sungei Golok is another joint station like Padang Besar. The station itself is in Siamese territory, but the cost of maintenance is shared by the Royal State Railways of Siam and the Federated Malay States Railways, as mentioned above.

From Sungei Golok, there is a road to the village of Toh Mah, about 30 km. away, in the neighbourhood of which gold mining is in operation.

Now let us once more return to Haad Yai Junction and pro-

ceed northward with the International Express. Only 6 km. away is Ban Din Lan where there is a large tin mine. On both sides of the railway, there are patches of tropical rain forest. About seven or eight kilometres north of Haad Yai, the train passes through large tracts of open forest, consisting chiefly of a species of small trees with a pale flaky bark (Melaleuca leucadendron), the source of cajaputi oil.

At Kuen Nieng, 25 km. from Haad Yai, there is a state highway 83 km. in length leading southward across the Peninsula to the town of Satul on the west coast.

Satul's population is about 35,000, consisting mostly of Mohammedan Siamese. The town is a regular port of call of coastwise steamers. Just above Satul, Siam owns both sides of the Peninsula from the East to the West instead of sharing it with the British as she does in the South. This sole proprietorship is maintained right up to the Isthmus of Kra where the frontier of Burma marches with that of Siam right up to the northern frontier.

A little further on from Kuen Nieng, there are several limestone hills, with a peculiar vegetation of their own, rising abruptly from the plain. Patalung (Km. 846), another town is reached in less than two hours from Haad Yai. The scenery here is beautiful, made up of isolated limestone cliffs standing in bold relief over the plain. On one of these cliffs several hundred feet high is perched a pagoda, to which there is a foot path for the worshippers to climb up.

Patalung is an old town facing the Inland Sea which extends northward from Singora. Judging from archæological objects and images of the Buddha found in the caves of Patalung, it is estimated that this town is over one thousand years old.

Patalung is well known as the home of Siamese shadow play, called *Nang Talung* or "the Leather of Patalung". This form of entertainment is performed in the evening in a small hut erected for the purpose, one entire side of which consist of a white sheet. The audience sit on the ground out-side and watch the movement of the shadows cast upon the sheet by figures manipulated

in front of the light within the hut. The characters have movable jaws, arms and legs which are worked by the operators. They at the same time recite the parts of the play, which are nearly always stories from Brahman mythology. The performance is accompanied by an orchestra composed almost entirely of cymbals and gongs. The stiff leather figures are made with great care and, though no more than their shadows appear to the public, they have the detail of costumes, jewellery, etc. skilfully painted upon them. This shadow play is one of the principal forms of entertainment in Southern Siam.

Patalung serves as a terminus of the State highway which runs to the town of Trang and the port of Kantang on the west coast of the Peninsula. The distance from Patalung to Trang is 68 km. and from Trang to Kantang, another 30 km. The road between Patalung and Trang, especially that section between Km. 33 and Km. 50 is well-known for its picturesqueness.

Passing through virgin forest and zigzagging its way in and out of the mountain with valleys deep down on one side and the steep Tenasserim on the other, the road brings the traveller into the very heart of nature. For those who wish to see the tropics in its unperturbed form, there is nothing better than to travel over this section of the highway.

Both Patalung and Trang are rich in rubber and coconut. All along the highway, there are a great number of plantations. Rice and bananas are also grown everywhere.

Trang is a pretty little town with a population of 85,000. There is a considerable number of Malays and Chinese. The streets are well kept and the buildings in general are well maintained. There is a good hospital and a good school managed by the American Presbyterian Mission.

From Trang to Kantang, there are a road and a railway running almost parallel to one another. Kantang is a port of call of all coastwise steamers.

From Patalung it is 65 kilometres by rail to Khao Chum Tong Junction. Shortly after leaving Patalung, the train passes through wide stretches of open grassy savannah with scattered

clumps of trees. Growing among the grass of this savannah are many small plants with striking flowers, such as a white flowered dwarf *Holarrhena*, *Ezucum tetragonum* with white and blue flowers, a curious dwarf *Dillenia* (*D. hookeri*) with large yellow flowers and a *Decaschistia* with bright pink, hibiscus-like flowers. Near Tha Samet station (Km. 806.09) is an interesting association: a low growth of sandy soil having as its dominant plant a feathery shrub, *Baeckia frutescens*, not unlike a tamarisk. With the *Baeckia* grows the cajaputi tree, usually only a shrub in this association, and a plant that is familiar to most travellers, the common bracken (*Pteridium aquilinum*).

Close to the Tha Samet station is a river, the Tha Samet, navigable only to small craft. This river flows through dense forests into the Pak Panang river, infested with crocodiles.

At Khao Chum Tong (Km. 781.03) there is a branch of the railway 35 km. in length leading to the town of Nagor Sridharmaraj. The railway junction here is situated quite close to the mountain; were it not due to the obstruction of this mountain, the line to Nagor Sridharmaraj would have been branched off from the main line at Tung Song and the distance from Bangkok would have been considerably shorter.

Nagor Sridharmaraj is one of the oldest towns in Siam. The town was founded more than one thousand years ago. It was once a powerful kingdom in itself, and dominated the whole of the Malay Peninsula; but the rise of the Malay Power in the thirteenth century and afterwards, gradually undermined and finally extinguished its authority. To-day Nagor Sridharmaraj is a Province of the Kingdom of Siam.

Nagor Sridharmaraj has many beautiful and interesting sights for the visitors. Temples are numerous and well maintained. Wat Mahathadu, the most notable temple of the town is over one thousand years old. The town itself is kept clean and the streets are well looked after, lighted all through with electricity. There is also a good hospital managed by the American Presbyterian Mission. About twenty miles outside of the town proper is a very beautiful waterfall, the "Garome."

Nagor Sridharmaraj is the home of perhaps the most distinctive Siamese art, the "Niello" work which has been practised in the country for over eight centuries and in which a high artistic level has been attained. The process consists in the tracing of designs on silver by means of gentle repoussé work and afterwards filling up the depressions so that with a black metallic substance obtained from lead, copper and silver melted together with sulphur, fused into place and polished until a smooth, even surface is obtained, on which the detail of the patterns are shown with clearness and effect against the black filling. This form of art is now in great popularity in Siam.

Another form of Siamese art, which perhaps originated in Nagor Sridharmaraj, is the Siamese dramatic performance, known as "lakon". The name of this entertainment derived from the name of Nagor Sridharmaraj which is sometimes called Lakon.

From the town there is a road leading to Ronpiboon, the important tin mining centre; from Nagor Sridharmaraj it is possible to reach Ronpiboon by either road or rail.

From Khao Chum Tong Junction, let us proceed northward by rail and the next station, 5 km. away, is Ronpiboon. Here, the Talerng Tin Dredging Company with a capital of over Ticals 3,000,000 is situated. The premises of the company can be easily reached by automobile from the station. The company owns one of the largest dredgers in the country. Ronpiboon is one of the largest tin mining centres in this country.

At Km. 770, or 6 km. northward from Ronpiboon immediately before reaching the summit (134.68 m. elevation) a tunnel, 235 metres in length is passed. This is the only railway tunnel south of Bangkok.

The scenery after leaving Ronbipoon is well worth viewing as curves, high banks, cuttings and deep gullies follow one another in rapid succession.

Upon emerging from the tunnel, the down hill run commences and Tung Song Junction (Km. 757.33), another important centre of railway activities is soon reached. Here the International Express makes a long halt to replenish water and firewood. Tung

Song, as an important junction of the railway and also as a centre of the mining districts, has grown up very rapidly. The Siam Commercial Bank has a branch, and several ore buying concerns have agencies working here. The future of Tung Song, in fact of practically all towns within the mining area, depends chiefly on the tin industry, a boom in the market generally means prosperity for all concerned.

From Tung Song, there is a branch of the railway 93 km. long to Kantang, the west coast port, already described.

All along this branch line, there are numerous rubber plantations and tin mining districts, of which Huey Yot is the most important and the oldest. The dredging is done by the Huey Yot Tin Dredging Company with a capital of over one and a half million Ticals. When the tin industry was at its best, this small town was the scene of thousands of happy workers. Now, since the decline in the price of tin, the town has become quieter and less populous. The branch line terminates at the port of Kantang which is the regular port of call of coastwise steamers from Penang to Bhuket.

Let us now return to Tung Song, the junction where we shall once more start northward towards Bangkok. Here one gets a splendid view of the mountains and the peaks which tower high to the East in the direction of the sea; behind the hills are the well known mining centres of Ronpiboon and Nawng Pet. Near Tung Song, there are several limestone caves and a beautiful waterfall which may be reached by elephant or on foot and return within one day.

There is a railway resthouse at Tung Song.

Just north of Tung Song, the country is heavily timbered and well watered but the population is extremely sparse. Between Tung Song and Ban Nasan (Km. 673.61), 84 km. away, the country is practically unexplored. There are mountain views on the side of the railway line, and here and there is beautiful jungle scenery; Ban Nasan is reached soon after two hours from Tung Song Here is the headquarters of the Eastern Siam Tin Dredging, Ltd. Ban Nasan and its surrounding country is well watered, being

Afterglow, Wat Arun

Song as an important junction [illegible] and also as a centre of the mining districts [illegible] rapidly. The Siam Commercial Bank has a branch [illegible] several ore buying concerns have agencies [illegible] future of Tung Song, in fact of practically all [illegible] the tin mining area, depends chiefly on the [illegible] in the market generally looks prosperity [illegible]

From Tung Song [illegible] railway 93 km. [illegible] Kantang, [illegible]

[illegible] numerous rubber plantations [illegible] Huey Yot is the most important and [illegible] by the Huey Yot [illegible] one and a half [illegible] best, this small [illegible] works. Now, since [illegible] quieter and [illegible] of Kantang [illegible] from Penang

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[illegible] heavily timbered [illegible] purse. Between [illegible] km. away, the [illegible] mountain views on [illegible] beautiful jungle [illegible] from Tung Song [illegible] Tin Dredging, Ltd. [illegible] well watered, being

F. S. HARROP

drained by the tributary of the Tapi, the largest river in Southern Siam. One hour northward from Ban Nasan is the town of Surashtra Dhani (Km. 635) or commonly called Bandon.

Bandon is a large town of some 13,000 population, situated on the Tapi, the same river whose tributary drains the surrounding country of Ban Nasan. Bandon's river front is very picturesque as a large number of the population reside in floating houses along the waterway. The Tapi with its picturesque floating houses can be seen from the train as it crosses the bridge before reaching the station. At the station, there is a large pontoon from which passengers may embark on the numerous steam and motor launches to the town proper, 14 km. away.

Fourteen kilometres from the station and six from the sea, is the town of Bandon, an important trade centre of this section of the country and a regular port of call for coastwise steamers. Bandon boasts of numerous saw mills and a thriving trade in timber. A coal mine was once in operation but the business did not prove sufficiently profitable to carry on.

A glance at the map reveals that the Tapi is a river originating from the Tenasserim Mountain. One of its tributaries is close to the town of Takuapa, which is accessible to the sea. The route from the sea to Takuapa and thence across the mountain to the Tapi and by the Tapi out to the sea at Bandon was followed by the early Indian settlers and traders while the merchants from Sumatra usually landed at Krabi, also a town on the west coast and from there crossed over the Tenasserim to the Tapi and followed the Tapi north-eastward to Bandon. The Tapi has thus served as an important means of communications for over a thousand years.

From Bandon northward, the country gradually changes from timbered jungle into open grazing grounds and rice fields. Limestone cliffs are seen practically everywhere. The railway runs close to the coast line, and serving all the towns on the east coast, celebrated for their fisheries.

Thirty-eight kilometres from Bandon is the small town of Chaiya. Chaiya is an old town settled by early Indian or Suma-

tran traders who came from the west coast by means of the Tapi river. Here will be found temples and monuments centuries old—perhaps the oldest in the country, many of them in crumbling ruins.

The country surrounding Chaiya as well as that north of Chaiya is well covered with rice fields; a large number of the population engage in fisheries as well as rice growing. Langsuen, another important town, is reached within two hours.

Langsuen is 549 km. from Bangkok. It is a town with a population of about 32,000. The railway station is about ten kilometres from the town proper. A considerable amount of tin is mined in the surrounding district. The majority of the population, however, engage in fruit gardening and fishing. The town is drained by the Langsuen river and is easily accessible to the sea. Coastwise steamers make Langsuen one of their regular ports of call.

Sixty-five kilometres north of Langsuen is the town of Chumphon, another important centre of railway activities. Chumphon is situated on the Isthmus of Kra which is the narrowest part of the Peninsula, being only about twenty miles across from the China Sea to the inlet of the Bay of Bengal which cuts into the land from Victoria Point. It was about here that the International Canal of the Isthmus of Kra, projected by de Lesseps and Deloncle in 1881, was to have cut the Peninsula. However, owing to political reasons and other circumstances, the plan was eventually abandoned.

Chumphon has a population of about 35,000; the town proper is situated close to the station, about ten kilometres from the mouth of the small river on which the town stands. The chief products of Chumphon are "platu," a fish of the herring species, and birds' nests. The latter are the edible kind so beloved by the Chinese gourmet.

The harbour of Chumphon is always a busy port. A large number of people engage in fishing, curing fish for the market and all coastwise steamers make regular call to transport them away.

From Chumphon there is a route, 51 km. in length, leading

across the Peninsula to Taplee, a district on the western frontier of Siam, adjoining Burma. From Taplee, one may proceed by boat to Ranong, Victoria Point, Bhuket and all towns on the west coast of the Peninsula. This route between Chumphon and Taplee is the shortest route between the two coasts and has served as a trade route for centuries past.

There is a railway resthouse at Chumphon.

Soon after leaving Chumphon, the railway runs through a rolling open savannah, grassy hills with here and there a few scattered trees, that extends for about 60 kilometres. This country was once thickly forested, like that to the south of Chumphon, but the forests have been destroyed chiefly through the system of clearing cultivation. It is said that these forests were wrecked by a typhoon, which occurred about sixty years ago and no doubt that typhoon was responsible for some of the damage. Now annually recurring grass fires prevent the re-afforestation of the area. The grass here is that planters' bane, lalang (*Imperata arundinacea*). It will not be noticed that many of the remaining trees after standing like sentinels alone on the hill tops are palms (*Livistina sp.*). Along the stream courses a tall screw pine is common.

At Na Cha Ang, 5 km. from Chumphon, there is a large and up to date plantation of coconuts. Practically all the lands along the coast of the Gulf and on both sides of the railway line north of Chumphon have already been taken up by capitalists from Bangkok and elsewhere, and a good deal of new land has been brought under cultivation. From Na Cha Ang (Km. 463.20) northward, the railway line starts on a slight incline, the summit of which is reached at Ban Kok Ma (Km. 447.50) the next station, from where it proceeds down hill until another station Bang Son is reached. From Bang Son (Km. 439.34), there is again an up grade as far as Mab Amrit (Km. 420.60), elevation 121.14 m.

Huey Sak (Km. 399.91), just north of Mab Amrit, is the nearest station to the well known Bangbert Farm, where scientific farming and gardening are carried on.

Twenty-three kilometres further is Bang Sapan Yai (Km.

376.52), the district celebrated for its placer gold fields which have been worked from time immemorial. Gold mining was started by an European Company over 30 years ago on the hills to the West, but did not prove a success owing principally to mismanagement.

From Bang Sapan Yai northward, the railway line runs much closer to the sea, and the scenery is simply delightful whenever an opening in the jungle affords an occasional view of the sandy beach and the blue water of the Gulf of Siam. The soil in every part of this section of the country seems quite suitable for coconuts, and the palms can be seen all along both sides of the line.

Soon after leaving Bang Sapan Yai, Ban Krut (Km. 360.53) is reached. Ban Krut has recently become a mining centre of the South Siam Mining Co., Ltd., with a capital of 1,250,000 Ticals. The prosperity of the town will no doubt depend largely on that of the mining industry.

Thab Sakae (Km. 342.06) is another tin mining centre. The Thab Sakae Tin, Ltd., established their headquarters here. The village has grown rapidly during the last few years.

Thirteen kilometres further north is Huey Yang (Km. 329.08). This village is well known for pearl fishery. The pearls, however, are small and lack lustre. Huey Yang is also a good centre for big game shooting; deer, sladang, mountain goats, etc. are plentiful in the foothills about ten kilometres west of the line. There are plenty of birds, peacocks, pigeons, snipe, etc. In the surrounding district, there is a large amount of fine land between the railway line and the hills, all of which should repay clearing and cultivation. Wild rubber is very plentiful but scarcely worked at all.

As the train approaches Nong Hin (Km. 310.37), the high hills of Prachuab Kirikhan are seen. They are very picturesque and striking. Soon afterwards, the town of Prachuab comes into view.

Prachuab Kirikhan (Km. 302.34) has a very fine bay and together with its high hill and rocky islands, the appearance of the town is very picturesque. There are plenty of game in the hills and on the islands. The town with its surrounding districts

has a population of about 30,000. It is a trade centre and a seat of the Provincial Governor. Its fine beach has already attracted many residents from Bangkok, many of whom consider it to be one of the finest seaside resorts in Siam.

In the neighbourhood of the town, there is a fine timber district, and a timber trade could be started in the various hardwoods, as transport by rail from the forest is only 30 km.

Prachuab Kirikhan has an aerodrome of the Royal Aeronautical Service. It is not unusual to see many airplanes flying above from the train window. Coastwise steamers also make this town one of their regular ports of call.

It is interesting to note that Prachuab Kirikhan is situated at the narrowest part of Siam on the Peninsula. From the sea to the Burmese frontier the distance is less than twenty-five miles. Once it was proposed to construct a railway from here to connect with the railway of Burma which will be extended down from Tavoy to Mergui and Tenasserim. But owing to the high costs of construction over mountainous districts and the estimated return being barely enough to pay working expenses, the proposal is still delayed.

Soon after leaving Prachuab Kirikhan, the line approaches the coast, and pretty views of the cliffs and hills are seen. There is a fine natural arch in one of the hills to the east side of the line. All the lands along this section of the country are fertile and are quite saitable for paddy cultivation and general farming.

At Kan Kradai (Km. 294.76), eight kilometres north of Prachuab, there is a very interesting cave in one of the hills, which the residents of Prachuab often visit.

After passing Kuwi (Km. 271.33), the country is flat and open, while the hill scenery becomes more striking. These are the group of hills known as Sam Roi Yot (three hundred peaks). The hills are reported to be full of game including tigers, bears, buffaloes, sladang, wild cattle, etc.

The country on both sides of the line between the stations Sam Roi Yot (Km. 254.99) and Nong Khang (Km. 246.94), serves as a good snipe shooting ground during the snipe season.

Pran station (Km. 235.85) is soon reached. Pran River is tidal for some distance above the railway crossing and is a fine stream full of good fish. The view on both sides of the lines at the bridge is very pretty. The river is crossed by a steel bridge of 80 metres span. The distance from the bridge direct in a straight line to the coast is eight kilometres but by the tortuous course of the river the distance is over 24 kilometres.

Wang Pong (Km 232.92) is reached after Pran. Here the International Express stops for ten minutes to replenish the engine with water and firewood. Wang Pong is a good starting point for big game shooting.

The next station is Kao Tao (Km. 225.40), the village being so called from a fancied resemblance of a hill on the coast to the turtle's back. Kao Tao is one of Siam's popular seaside resorts. From Kao Tao northward for fifty kilometres to Nong Tapot (Km.198) the district embraces a particularly dry, cool zone. Nowhere else in the Kingdom is the temperature so equable, and the dryness so remarkable. Owing to its suitability as a health resort, the Government a few years ago created the Board for the development of the Western Seaside Resorts to bring about health facilities for the general public within the specified zone.

The next station northward from Kao Tao is Nong Khae (Km. 216.95), and then comes the well-known health resort of Hua Hin.

Hua Hin is 229 kilometres from Bangkok. Ten years ago Hua Hin was a small fishing village with a very few bungalows, but to-day it is without doubt one of the most popular seaside resorts in the East. Its fame has spread even to the West and visitors passing through Bangkok often stop off for a day or two. To the residents of the Federated Malay States and Straits Settlements without a large enough and attractive enough seaside resort of their own, Hua Hin affords the nearest, cheapest and best place for a holiday. It is patronized all the year round, mostly by Bangkok residents who find there a welcome week-end rest. During the cold season, it is ideal. The mornings and evenings are cool, there is a constant breeze, either from the land or the sea and the air is absolutely dry and stimulating. Sea bathing is

absolutely safe and excellent. The tennis courts are always in excellent condition and the golf course is one of the finest in this part of the world. Hua Hin has developed so rapidly that the fine hotel built by the Railways on a slight prominence overlooking the sea, and almost on the beach, has now been found altogether inadequate to meet the demand made on it.

For several months a year, Their Majesties adjourn to the Royal Residence at Hua Hin. It is not unusual that during such period, the meetings of the Supreme Council of State as well as those of the Cabinet of Ministers are held there.

From Hua Hin, the train proceeds northward, running almost parallel to the coast, passing several resort stations. Huey Sai Nua which used to be the seat of a country residence of the late King is passed at Km. 197.86.

Cha Ahm, another popular seaside resort with many fine residences of princes and nobilities, is at Km. 187.06. Just after passing Cha Ahm, the hills on the left are worth observing: high cliffs rising from the plain precipitous on the east side and sloping on the west. The coast people all along this section of the country do a considerable fishing business and breed cattle, whilst the people in the interior cultivate paddy lands and do a small trade in jungle produce.

At Km. 182.56 is Nong Tapot station, the northern-most point in the development zone of the Western Seaside Resorts. As the train appoaches Petchaburi, a number of toddy palms are seen growing on the bunds of the fields. These palms are the chief source of sugar in this part of the country.

Petchaburi with a population of 125,000 is an old town, full of historical interest. In bygone days, this town was the eastern terminus of the overland trade routes by which trade from India and Europe found its way to Siam before the sea route round the Peninsula became well known. The town of Petchaburi used once to be the seat of the ruling prince in the early days of Siamese history. Now it is the seat of a Provincial Administration. Petchaburi possesses some fine ruins in the shape of Brahmin and Buddhist temples of stone and large bricks, relics of its ancient

glory and civilization. There is an old palace built by King Mongkut on the hill top, and also a modern palace built by King Chulalongkorn, and the caves are famous. Petchaburi is a headquarters of the American Presbyterian Mission. The Mission here was started in the year 1867 and the work has been steadily carried on ever since. The Mission conducts a school and a well equipped hospital which has proved a great boon to the population.

From the railway station, there is a good view of Khao Wang (Palace Hill) with palaces and monuments constructed by King Mongkut. Soon after the train departs, on the west side of the line is seen a long row of isolated limestone hills that frequently take on the most weird and fantastic shapes and, further away, the formidable ranges of the Tenasserim which separate Siam from Burma can be distinguished.

At Ban Noi (Km. 133.9) there are many picturesque limestone hills of which Khao Yoi is the most notable. This hill contains a large airy cave from whose roof hang down stalactites in picturesque profusion while on its floor rests a gilt image of the reclining Buddha. The slopes of the mountain are peopled by a merry colony of monkeys.

From Ban Noi to Rajburi (Km. 101.25) the line passes through a flat country of swampy tracts and paddy fields, intersected by a network of canals which are often frequented by smaller sea-going sailing craft.

Rajburi is an old town with a population of about 220,000. It is the capital city of the Circle of Rajburi and is thus the seat of a Lord Lieutenant and a Governor. There are hills in the neighbourhood and forests of fine hard wood. Up the river there are lead mines, and tin; zinc and antimony have also been worked. There are limestone quarries in the Province, and there is a considerable output of lime.

Rajburi is drained by the Meklong, one of Siam's most important water courses. As the train crosses the bridge over the river, a good view of the town can be seen. Along the water front is a large number of river craft and floating houses. The Meklong flows southward from Rajburi through tracts of exten-

sive fruit gardens and out into the Gulf of Siam.

Rajburi has many attractions for the visitor. There are several old temples, many caves and hills. For those who take interest in archæology, Rajburi should prove a worthwhile centre to study.

Between Rajburi and Ban Pong, the level of the country rises slowly and the presence of sugar palms becomes less marked. Villages and houses of the real old Thai pattern with the pointed gables and the carved beam ends are seen every here and there. To the south and the south-east the eye sweeps over a distant stretch of paddy fields.

The busy station of Ban Pong (Km. 68.23) is reached within an hour from Rajburi.

Ban Pong is a prosperous village, standing on the banks of the Meklong. From the train one catches a glimpse of this stream with its yellow sand banks and numerous trading boats. From Ban Pong there are highways leading to Nagor Pathom and Kanchanaburi.

The road from Ban Pong to Kanchanaburi is 51 km. in length, passing through a very interesting country, rich in tobacco, cottonand rice. At about 15 kilometres by road from Ban Pong is the well known village of Pong Tuk where an extensive excavation was recently carried out by the Royal Institute. The site of the excavation is on the west bank of the river. Though not offering anything very spectacular to the eye, these remains of ancient temples and stupas alone by, their hoary age (VI c.) must compel an absorbing interest. Moreover the objects found there, such as an ancient statuette of the Buddha and a lamp of Greco-Roman origin, help to conjure up in the mind of those who love the secret of the past, the chequered picture of the life of that remote time when Indian adventurers and Buddhist missionaries arrived to plant their civilization in this country. The statuette of the Buddha, now in the Bangkok Museum, belongs to the so-called Gandharian school of art dating back to the second century and hailed from somewhere on the eastern coast of India, while the lamp, also in the Museum, being

a replica of those used in luxurious Pompeii, indeed suggests the relation which must have existed between Rome and the Indies during the first century of the Christian Era.

Kanchanaburi is a neat little town, northwest of Ban Pong. The town is well known for its good native tobacco, its kapok plantation and its gem mine. The origin of the town is quite recent as its foundation goes back to the time of the first reign only (1782-1809), when it was built as a fortified camp to withstand the attack of the Burmese, at the same time serving as a base for the operation of the Siamese armies fighting against the enemy. Kanchanaburi has a very pretty location at the confluence of the two streams, the Meklong and the picturesque Saiyok.

Northward from Ban Pong the train runs in an easterly direction through low lying paddy fields and swampy tracts that often suffer from inundation. Every here and there along both sides of the line are small villages of rice cultivators. At Km. 49.8 the train passes a small picturesque station, Sanam Chandra, constructed in ancient Siamese style, during the time when the late King was in residence at the Sanam Chandra Palace. This palace has since been given up to be used as headquarters for the central administration of the Circle of Nagor Chaisri. Immediately after Sanam Chandra is passed, the train enters Nagor Pathom and soon the Nagor Pathom station (Km. 48.13) is reached.

Nagor Pathom and its surrounding districts have a population of about 60,000 people. Nagor Pathom is the seat of the famous Pathom Chedi, the biggest monument of its kind in Siam. At present it is the capital city of Nagor Chaisri, one of the richest and most fertile Circles of Siam.

The famous sanctuary of Nagor Pathom consists of a large square brick mount, rising in two terraces, on the upper one of which stands a colossal stupa or chedi, which is enclosed by rotunda. The top of the chedi is 115 metres above the ground. Within the precinct of the sanctuary, there are countless relics of Buddhism which should be of interest to tourists.

The history of Phra Pathom Chedi dates back as far as A. D. 500. When the sanctuary was first built, it had the form of an

Phra Pathom Chedi.

Indian stupa possibly surmounted by a spire, which was the work of the Indianized Môn people. Later, during the Khmer domination this Buddhist sanctuary was transformed into a Brahmanic one and the stupa having fallen into disrepair, was restored. But instead of having the spire of a chedi, it was crowned with a prang, 40 metres high. More than 800 years afterwards when King Mongkut resolved to repair the sanctuary, which had again fallen into disrepair and become overgrown with jungle, it was decided to rebuild it in the form of a phrachedi. The work was started in 1860 and little by little rose the enormous bell-shape structure, inside and under which are now hidden the former buildings of the old stupa and the prang.

Besides the Phra Pathom Chedi, the town contains many other interesting monuments and buildings. The district surrounding Nagor Pathom is above flood level and is very extensively cultivated as garden ground for the supply of Bangkok, Rajburi and other places.

Northward from Nagor Pathom, the train rolls along a flat and fertile country, through paddy fields and garden-lands.

At Km. 35.13 is Ban Khmer, a station named after a colony of Cambodian prisoners of war.

The next important station is Wat Ngiu Rai (Km. 30.47). Here the line crossed a tall steel bridge, 132 metres in length over the Tachin River which flows into the Gulf of Siam. From Wat Ngiu Rai station, there is a regular motor launch service to Suphanburi, another historical town of great interest.

Between Wat Ngiu Rai and Taling Chan Junction several small villages are passed, the country is quite open with rice fields stretching far away on both sides of the line. At Km. 19.59 is Sala Ya, a popular snipe ground where a fair shot is sure to get a reasonable reward. The snipe season starts from about September and lasts until about April.

Taling Chan is the junction where the railway lines which start from Bangkok and Bangkok Noi unite. Passengers from the South who wish to proceed to Bangkok Noi have to change here. Bangkok Noi is the station on the west bank of the river,

just opposite to Bangkok proper.

From Taling Chan Junction, the train passes through an endless succession of fruit gardens, containing a profusion of rare trees, the fruits of which in many cases are only known by name to the foreigners; besides the well known coco and betel palms, orange, mango and jackfruit trees, are guava, pomelo, lanut, durian, linchi, langsat, pomegranate and still others all delicious and delightful.

Soon the train approaches the Rama VI Bridge which crosses the Chao Phya River. The total length of this bridge is 442 metres. The bridge was named after the late King during whose reign construction work began. As the train crosses the bridge one gets full views of both up and down the stream of the great Menam, the mother of the waters, whose banks are clad with the luxurious vegetation of graceful palms and all kinds of fruit trees. To the south the smoke of the chimneys of rice and saw mills tells the whereabouts of the great bustling city.

After crossing the bridge, the line forms a big curve joining the southern and northern lines together at Bangsue, just north of Bangkok. An extensive railway yard is being constructed here and in time Bangsue will become one of the most important railway centres in this country.

At Bangsue is the large factory of the Siam Cement Company. The quality of the cement turned out by this company is excellent. At present its output is sufficient for local requirement and a considerable quantity is being exported to Singapore, where it is giving satisfaction. Two of the chief materials required for making cement, clay and marl are found locally. The interest in the company is largely Siamese.

Bangsue is already a part of Bangkok. From Bangsue onward the train passes through Bangkok's suburb until the Hualampong Railway Terminus is reached.

Bangkok with its suburbs contains almost a million inhabitants. It is the largest city in South-Eastern Asia. Bangkok has been the capital of Siam since 1782. It is the seat of all the Ministries, all the big administrations and the centre of the intellec-

tual, commercial and industrial life of the country.

From a tourist's point of view, Bangkok is a unique city. It provides a vista of fascinating views, a wealth of imposing temples, beautiful palaces and immediate surroundings that cannot fail to attract and impress. There are excellent roads, good hotels and cheap means of conveyance. Perhaps, Bangkok, as a city for tourists, is best described in the following words of Mr. Mark T. Greene:

"Bangkok is a capital unlike any other in the world, a huge city of vivid contrasts where the world and the ages meet, where in enjoyment of the comfort of every modern amenity the tourists may yet regard the life of centuries past unaltered in the slightest degree. In Bangkok a spectacle unbelievable as a dream is before him, a panorama of color like a theatrical extravaganza a hundred thousand times multiplied. Though he has sought and failed to find the East of his dreams all the way from Suez to Shanghai, it awaits him in Bangkok, for Bangkok is the capital of Siam and Siam is the very heart of the East."

Bangkok is a healthful town. The rate of mortality is 29.5 per thousand which compares favourably with most of the cities in this part of the world. The city has an excellent water supply and several well-equipped hospitals and health centres. The lowest and highest temperatures recorded in Bangkok vary from 17° C. or 62°F. in December to over 35°C. or 96°F. in March, with a mean temperature of about 28°C.

Commercially, Bangkok serves as Siam's most important port. The bulk of the business is transacted in Bangkok proper on the left bank of the Menam Chao Phya, about 35 kilometres from the Gulf. This river (usually referred to as the Menam, the Siamese word for river) is navigable for deep draught vessels after the bar is crossed, but is limited by this obstruction to vessels of from 12 ft. 6 inches to 14 ft. 6 inches draught at high water. Larger vessels must anchor at Koh Si-Chang, an island lying just outside the Bar. The value of the total foreign trade of Siam is about 400 million Ticals each year and about eighty per cent. of this trade passes through Bangkok.

In religion, Siam is without doubt the most active centre of Buddhism to-day. It is generally estimated that over two-thirds of the population of Asia, or over 500 million people are followers of Buddhism and in spite of the fact that complete religious freedom exists in Siam, practically all Siamese are Buddhists. Bangkok is important in this respect in that it is the seat of the Buddhist Church and the most important centre of Buddhist activities.

Although Bangkok deserves a more lengthy pondering on our part, it seems wiser to proceed on further into the heart of the country where lie the powers that brought about the wealth and prosperity which are directly responsible for the present position of Bangkok.

With exception of the Southern Lines, all the State railway lines radiating from Bangkok run on the east bank of the Chao Phya River. The Northern Line proceeds northward from Bangkok to Chiengmai, 750 kilometres away, passing partly through the great central plain of Siam which supplies most of the rice for export and thus brings into the country a large measure of prosperity, wealth and progress, and partly through the picturesque hilly section of Northern Siam, abounding with teak forests and mighty streams. The journey from Bangkok to Chiengmai is indeed a trip through the very heart of Siam.

For about fifteen minutes after leaving the Bangkok Terminus the train passes through the suburbs of Bangkok over the busy and bustling railway yard. The Eastern Railway Line to Aranya Prades, from where travellers may proceed to Saigon and the famous Angkor Wat, is seen branching off from the Northern Line shortly after leaving Bangkok.

Immediately after this, on the left hand side is the royal station of Chitralada, while on the right is the Phya Thai Palace, a former royal residence transformed into a modern hotel, under the management of the Royal State Railways of Siam. Bangsue (Km. 7.796) is soon reached. Here the Southern Line branches off in a westerly direction. From Bangsue onward, the train traverses an immense plain which continues on for about 300 kilometres.

At whatever period of the year it may be your fortune to pass through this great area, one of the thoughts that must confront the thinking mind is "From whence does the labour come to deal with the stupendous crops grown on this immense field?" The answer is a comparatively simple one. If carefully scrutinized it will be observed that the land is dotted all over with tiny dwellings surrounded by trees to keep away raging storms. These for the most part are the homes of the paddy cultivators, who produce paddy of the finest grade in huge quantities year after year without interruption.

From August to January, the country we are now passing is a happy hunting ground for those who prefer the strenuous sport of snipe shooting to the milder exercise of golf on Sunday mornings. From any station beyond Bangsue to Klong Rangsit (Km. 28.533) good bags may be obtained on either side of the line.

At Laksi (Km. 17.576) there is a new wireless station. Laksi is now an important headquarters of the Radio Service of the Post and Telegraph Department.

Don Muang (Km. 22.203) is the headquarters of the Royal Aeronautical Service. Don Muang is well known for its excellent landing ground and its fully equipped aerodrome which has a complete installation for the repair of 'planes. These shops are able to turn out complete 'planes to replace those damaged in the service. Don Muang has been looked upon by practically all long distance fliers as an essential port of call.

From Don Muang onward, especially at Klong Rangsit (Km. 28.533), one begins to realize how important a factor the Menam and its tributaries are in the economic existence of the people. The canals serve the dual purpose of irrigation and transport. The result of scientific irrigation and extensive cultivation is visible all around in the heavy crops of paddy and the well laden grain boats moving along the canals on their way to the mills.

Shortly after Klong Rangsit, the train reaches **Bang Pa-In,** the seat of His Majesty's country residence, the Bang Pa-In Palace.

The royal residence of Bang Pa-In is built on an island of which the mother of King Prasad Thong (1630-1655) was a native.

King Prasad Thong himself was born on this island. When he became King of Ayudhya in 1630, he apportioned land to the building of a temple and a palace where he could go and stay from time to time. After the fall of Ayudhya, Bang Pa-In was abandoned, and remained in that state until the reign of King Mongkut (1851-1868) who again restored it back to its present condition.

Bang Pa-In is a popular place for excursionists from Bangkok. The Royal Residence is within easy walking distance from the station and the journey from Bangkok may be accomplished either by boat or by rail.

From Bang Pa-In to Ayudhya, the distance is less than 14 kilometres. Ayudhya has one of the finest stations on the northern line. The station is on the left bank of the river while the town proper is on the right.

Ayudhya is a thriving city of about 270,000 people. It is a city of great historical interest, containing many imposing ruins and relics which once glorified the Siamese nation.

Ayudhya was founded in 1349 and was destroyed by the Burmese in 1767, it had thus been the capital of Siam for over four hundred years. During the period of its existence, it had been the seat of many a king, and the scenes of many triumphs and disasters. To-day the city is the commercial and administrative centre of the Circle of Ayudhya.

To residents of Bangkok and foreign visitors, Ayudhya is a place to be included in every itinerary for sight-seeing and holiday excursion. The city is easily accessible from Bangkok either by rail or river and the visit can be made within a day.

The remains of Ayudhya as well as those of Lopburi are of peculiar interest in that they represent all that is left of what may be called the mediaeval period of Siamese history. The ruins of Ayudhya, still bearing in all directions the marks of the fire by which the Burmese conquerors demolished the city a hundred and fifty years ago, having now been cleared, are preserved as well as may be. Sufficient is left of them to convey an idea of the greatness of the former capital. Sections of the outer and inner walls still remain erect, huge masses of rugged brickwork, while the

sites and foundations of the palaces and other buildings, the prototypes of many of those now standing in Bangkok can be identified. Here also are the remains of churches and houses built by the Europeans who frequented Siam in the seventeenth century.

The sights of Ayudhya are many; there are the gigantic bronze statue of the Buddha, perhaps the largest of its kind in Asia, the elephant kraal, where wild elephants were captured, the floating market, the Royal Palace, the Museum and many other notable sights that will require pages of description. For the present, we shall satisfy ourselves with only a passing glimpse of the city and proceed further on.

The next station north of Ayudhya is Ban Mah (Km. 73.128), where there are large barracks and an ammunition factory of the army. Straight forward on the horizon is the Phrabaht mountain, at the foot of which is the famous Phra Buddhabaht Shrine.

At Km. 90.374 is **Ban Phaji Junction,** another important centre of railway activities. Here the North-Eastern Railway Line branches off to Korat and Ubol.

Twelve kilometres north of Ban Phaji is the Tarua station (Km. 102.462) where the line crosses the Prasak River which leads to the Rama VI Barrage at Tha Luang, an important project of the irrigation work.

At **Tarua** there is a privately owned railway (guage 75cm.) 19 km. in length, which runs to the shrine of Phra Buddhabaht, situated on a detached mound of the range of chalk hills forming the line of watershed between the Menam Chao Phya and the Prasak Valley.

The Phra Buddhabaht or "Imprint of the Food of Buddha" was discovered in the reign of King Songtham, over 200 years ago. It is a natural hollow in the shape of a vat, similar to the one on the top of Adam's Peak in Ceylon. It is protected by a graceful pavilion built by King Rama I. at the end of the 18th century. In the dry season (February and March) of every year there is a large gathering of pilgrims to pay homage to the sacred symbol.

At Ban Moh (Km. 109) east of the station are to be seen the remains of the outer wall of Ku Muang, an ancient Khmer city, from which were brought several statues preserved at Phra Buddhabaht. From this station there is a road leading to the Phra-baht hills passable by motor car during the dry season.

The next station from Ban Moh is Ban Nong Don (Km. 116) with a good size village. There is also a road from this station to the shrine of Phra Buddhabaht. This station is nearer to the shrine than Ban Moh and is thus a more popular route for the pilgrims.

Lopburi, another important city, is reached at Km. 133. The city is built on the east bend of one of the arms of the Chao Phya River, on a chalky spur, jutting out from the Phra Buddhabaht range. The railway bisects the old town. The station lies east of the Palace, 1 km. from the river, in the immediate neighbourhood of the archæological ruins.

The ancient city of Lopburi, which was then called Lavo, was an important city as early as VII century. It was then a dependency of the Môn Kingdom whose princes founded the city of Lamphun in the North. From the X to the XIII century Lavo was the seat of a province belonging to the Khmer Empire, whose capital was at Angkor. After the foundation of Ayudhya, Lavo now called Lopburi, shared the fate of the neighbouring capital. In 1665, King Phra Narayana made Lopburi his summer residence as well as an alternate capital, to which the court could retire should Ayudhya fall into the hand of the enemy. The building of the outer wall, the Royal Palace and the water pipes was carried out by French architects and engineers. After the fall of Ayudhya, Lopburi was abandoned until King Mongkut ascended the Throne, and in his turn established his residence there.

To-day Lopburi with its surronding districts contains about 100,000 people. It is the seat of a Provincial Administration with a Governor in residence. The sights of Lopburi are grouped close to one another and can be easily visited on foot from the railway station.

Eleven kilometres north of Lopburi is Koke Katiem (Km. 144)

where an artillery range of the army and quarters of the aviation corps are situated.

Ban Mee (Km. 161.382) is a prosperous village with a good size market. It is a trade centre of paddy and local timber. The village is well lighted with electricity.

Chong Kae (Km. 180.32) contains a large quarry which supplies the Royal State Railways with a large quantity of ballast.

Ban Hua Wai (Km. 240) is the station for **Jainad**, 29 kilometres away. Jainad is an old town on the Chao Phya River. The city was mentioned in the annals of the country as far back as the XIV century.

Ban Khao Thong (Km. 235) is the headquarters of the Maintenance Engineer of this section of the Royal State Railways and a little further on is the small village of Ang Hin (Km. 241). This place is famous for its weaving industry. Its products are well-known throughout Siam for quality and workmanship.

Paknampoh (Km. 251) is an important trade centre owing to its situation at the meeting point of several waterways. All the way from Bangkok to Paknampoh, most of the land visible from the railway appears to be under rice cultivation but from Paknampoh northward the cultivated area becomes less and less.

So far we have passed through practically the whole of the important rice area of the country. The total area under cultivation amounts to some four million acres, and produces a crop varying from two million to two million and a half tons, according to the fortune of the season. Of this amount as much as twelve to fourteen hundred thousand tons will, as a rule, be available for export. This rice area is, therefore, literally the heart of the country, for if the rice crop fails through flood or drought the country is brought face to face with an economic disaster of the first order.

Paknampoh serves as an important Forest Duty Station where the duty on timber is collected. On arrival at Paknampoh the teak logs in the rafts are measured, their cubic contents calculated and Government dues on them collected. The logs are then examined by representatives of the lessees who pick out all unsuitable logs and sell them locally. It is estimated that 33% of

of the total number of logs are sold there.

The town of Paknampoh, officially called Nagor Svarga, is on the right bank of the river. It is a prosperous town of about 135,000 inhabitants. Paknampoh is the chief town of the Circle of Nagor Svarga and the seat of a Lord Lieutenant.

The next important station after Paknampoh is Bang Moon Nak (Km. 297). There is a road running from this station to Bejrabūrn, an old town in the valley of the Prasak River.

Pichit (Km. 346.79) another old town is soon reached. The ancient side of Pichit where the city flourished in the thirteenth century is about 10 km. to the west of the railway line. Pichit and its surrounding districts contain about 65,000 inhabitants. Its commerce consists chiefly of rice, tobacco and corn.

Our next stopping place is Bisnulok (Km. 389), another capital city. **Bisnulok** always stands high in the estimation of the Siamese for it contains one of the oldest temples in the land, inside which may be seen a famous image of Buddha. The image is said to be over 600 years old. It is rightly held in veneration, for it is certainly the most beautiful image and few visitors can resist the mysterious charm of its setting, or the calm and holy air it breathes.

Pichai (Km. 448) is another historical town containing several interesting ruins. This ancient city, which was fortified towards the close of the fifteenth century, is now encroached upon by the river.

Ten kilometres north of Pichai is Ban Dara Junction, from where a branch line leads to Svargalok, 28 kilometres away.

The twin cities of **Svargalok** and **Sukhodaya** are amongst the oldest towns of Siam. Sukhodaya is easily accessible by road, 39 km. south of Svargalok. These two cities are famous to sightseers for their ancient ruins and edifices. Sukhodaya is known as the first capital of the Siamese nation. The first independent King of Siam, Sri Indratitya, was proclaimed at Sukhodaya about the middle of the thirteenth century. His son, Rama Kamhaeng, who reigned at the end of the thirteenth century, has left us a most interesting account of affairs during that period.

In the middle of the XIV century Sukhodaya was compelled to accept the suzerainty of Ayudhya, the new Siamese capital in the South.

Svargalok flourished at the same period as Sukhodaya. The site of the original city is about 16 km. away upstream north of the present town. Many of the monuments and shrines in old Svargalok were built of laterite blocks, said to date back two thousand years and showing in their style of architecture a distinct connection of idea between the people who made them and the races who built or excavated from the rock, the ancient temples in different parts of India.

In the days of Svargalok-Sukhodaya's prosperity the art of making porcelain was introduced into that kingdom from China and Chinese experts were induced to settle at the capital and to ply their handicrafts there. Porcelain kilns were established on the bank of the river a few kilometres north of Svargalok city and in the outskirts of Sukhodaya, and the industry apparently persisted there for some six or seven centuries.

A short distance north of Ban Dara is Utaradit (Km. 485), the gateway of the Lao provinces. Here the scenery, customs and language undergo a sudden change. The rice-growing plain is succeeded by hills clad with tall trees, among which the teak predominates. The Siamese *panung* common to both sexes gives place to the *sin*, the graceful skirt of the Lao women.

Utaradit with its surrounding districts comprises about 80,000 people. The town is well known for its place of pilgrimage, the "Phra Thaen Sila Aht" where a stone slab is reverently preserved. In March of every year, Utaradit is a most busy centre of the pilgrims who journey to the city to pay homage to the Lord Buddha.

Shortly after leaving Utaradit, the train enters the hilly and well forested country. The scenery become more interesting and every now and then the engine has to labour strenuously to pull the train up over a mountain pass.

Ta Sao (Km. 489.358), the next station from Utaradit is well populated, containing a large number of shops and residences. It is

the centre of trade which comes down from Nan and the surrounding districts by waterways. From Ta Sao, the train goes up and up, winding slowly round the hill sides; on the one side are deep ravines, densely covered with jungle, and on the other, towering above in sharp contrast, a mass of sheer rock. All the while one inhales a draught of the fresh mountain air, and breathes the scent of the jungle flowers. The district contains a large number of tiger, deer and elephant, but they are rarely seen by railway passengers.

At Ban Dan (Km. 497.56), we reach the lowest outposts of the Lao people. These people are dressed in the *sin* or skirt (of red and black bands, as worn by the women of Phrae) with a close fitting bodice above, and have their hair dressed in layers, rather like the coils of a snake and very often, with a flower gracefully worn at the side. They laugh and chatter naturally and gaily, and seem to possess a temperament different from that of the ordinary southern peasant, who is as a rule reserved and shy.

At Km. 513.17 just before reaching the station of Pang Ton Phung, the train enters a tunnel, the first tunnel on the northern railway line from Bangkok. Km. 516.7 is the boundary point of the Province of Phrae and Utaradit. Here again there is another tunnel, 362.44 metres in length and immediately after emerging from the tunnel is the station of Kao Plung.

The low hills seen after passing Me Phuak (Km. 528.224) are chiefly covered with mixed deciduous forest, containing plenty of teak. The teak tree is recognizable by its large leaves or when the leaves have dropped, by the panicles of dry fruit sticking out from the top of the tree; in the rain its spray of white blossoms may be seen.

Soon after leaving Me Phuak, **Den Jaya** is reached. Here the train makes a halt of ten minutes to replenish the engine with water and firewood. Den Jaya is the terminus of a highway which connects the towns of Phrae and Nan with railway communication. Its rapid growth is due entirely to its advantageous location. A great amount of trade from the interior districts which has heretofore been sent to Ta Sao by waterways and thence

to Bangkok and other places by rail, now comes direct to Den Jaya by road. As the time and expense saved are considerable, many merchants from Ta Sao have transferred their headquarters to Den Jaya.

The road from Den Jaya to Phrae is 25 kilometres in length. It is a first class motor road and the journey between the two towns can be easily completed in less than half an hour. At Den Jaya on arrival of the train, several cars and motor 'buses are always ready for hire.

Phrae and its surrounding districts have a population of about 100,000 people, of which about 2,000 are made up of the various hill tribes. The town is surrounded by mountains and its various districts are covered with jungle and forest.

Like most of the cities in Northern Siam, Phrae is a mixture of town and country, and from its main street to the open field is only a short walk. The town has an old city wall, several interesting temples, many Government buildings and residences of officials and Europeans.

The American Presbyterian Mission has a station at Phrae, and has acquired a large plot of ground on the road from Den Jaya. The Mission owns a fine school and a hospital.

From Phrae there is a road leading to Nan, 110 km. away. At present this road is not metalled and is passable by motor car in the dry season only.

Nan is very beautiful, not only the city itself but the country all around. Wherever the eye wanders, it sees nothing but woodland and high hills. The city wall is high and built of red brick, and, being newer, is in a better state of preservation than those of the other towns in the North. The enclosed space is large, but the population is small and scattered.

As in the other towns of the North, the population of Nan is a motley one; Lao naturally form the majority, but the various hill tribes also have their settlements in the city. The only European element in the city is American for the Presbyterian Mission has a station in Nan, with a school and a dispensary where people can obtain an education and medicines at the cheapest

possible rate.

Now let us return to the railway station of Den Jaya and proceed further north. At Km. 540.7 the picturesque Gaeng Luang, a rapid of the Me Yom, is seen for the first time and from here onward the railway line follows the course of the Me Yom for some kilometres. In the valley of the Me Yom the upper part of the hills are entirely clothed with the dry deciduous non-teak bearing forest, known locally as Pa Deng, while on the lower slopes there is mixed deciduous forest with teak. At Km.545.11 is a post marking the boundary of the Province of Phrae, and from this point on we are in the Province of Lampang. The scenery near to Gaeng Luang station (Km. 546.946) and onward for almost one hundred kilometres is very picturesque. The railway line winds in and out of the mountain with steep rocks, high forests and rapids all along its path.

As soon as the train leaves Gaeng Luang station, numerous teak trees, large and small, will be seen on both sides of the line for several kilometres. Every now and then the train has to labour over a steep climb and, at not a few places, its speed is lowered down to almost crawling.

Ban Pin (Km. 563.865), a watering station, is soon reached. From the platform of this station it is possible to view the long stretch of the line for some distance. Its steep grade is quite noticeable.

At Pang Puei (Km. 591.076) the railway crosses the line of watershed between the Menam Yom and the Menam Wang, the river draining Lampang.

Another tunnel, 150.25 m. long, is entered at Km. 574.

Between Ban Meh Chang (Km. 600.334) and Ban Meh Moh (Km. 609.314) the line runs through a long stretch of bamboo (*Thyrsostachys siamensis*) and further on the country becomes less hilly, and Nagor Lampang (Km. 642.293) is soon reached.

Lampang is a large and thriving city. The town proper with its surrounding district comprises about 280,000 inhabitants. From the railway station there is a good asphalt road of about three kilometres in length leading to the town proper, where there are large Government buildings, and business quarters. Lampang

Chedi in Northern Siam.

is the terminus of the state highway which leads to Chiengrai and Chiengsaen in the extreme North of Siam. This highway, 326 kilometres in length, passes through one of the most picturesque and interesting sections of the country. It serves as the only means by which the people of the northern hill tribes as well as those of the Shan States may communicate with the outside world.

Lampang is very old. It is famous historically as a town which has been the scene of many battles and the seat of many kings. The original city which was founded between the VI and VIII centuries was on the right bank of the river Me Wang. Now the town occupies both banks of the river and its expansion is going ahead rapidly. As an old city, Lampang has many interesting monuments and temples.

The American Presbyterian Mission has a headquarters in Lampang. Its fine and well equipped hospital has proved a great boon to the population in general.

Lampang has now probably the most numerous European community in the North of Siam, most of whom are engaged in the teak industry.

The express train stops at Lampang for some minutes before proceeding further north. Owing to the steep grade between Lampang and Chiengmai, the number of carriages in the train must be reduced to the minimum. Between Lampang and Ban Bo Haeo (Km. 647.115) the grade is very slight and on both sides of the line, there are a great number of small wood trees. Soon after this, the line begins to wind up the steep mountain. At Km. 660.5 a rapid which flows into the Menam Wang is seen on the left hand side. The picturesque station of Pang Muang (Km. 661.134) is situated right on the bank of the stream. Throughout this part of the country the traveller has the best opportunity of viewing and estimating the magnitude and power of Siam's northern streams and the great resources of her forests. There are to be seen strewn over the banks of the wide stream, thousands of valuable teak logs that take several years on their journey from their native forests to the mills of Bangkok. These logs do not all belong to one firm but

to many. They are, however, easily distinguished as each one is carefully stamped throughout the surface with the initial of its owner.

It might be of some interest to give a brief account here of the teak industry.

When teak trees, which are found scattered through the forest and do not grow in clumps or plantations, have been girdled, i. e., ringed with an axe at the required height, they are left for a considerable period, one or two years, for the sap to run out. The trees are then felled and dragged by an elephant into the nearest creek. When the headwaters rise in September or October, the logs float out into a larger creek, and thus, moving on, season after season, eventually come into the main river, at some place on which each company has a rafting station. After the logs have been made up into rafts, they are floated down the Me Ping, Me Wang, Me Yom or Me Nan, as the case may be, until they reach the duty station at the junction of Paknampoh, where all the rivers become one, the Menam Chao Phya. The royalty on the timber is paid at Paknampoh, and the rafts are then floated down the Menam Chao Phya until they finally reach the saw-mills at Bangkok, where the logs are converted into planks, scantlings, squares, and shingles, for export to India, China, Great Britain or wherever else a demand may arise.

The ascent is so steady and steep that the line has to keep on winding throughout. A new picture is presented at every turn, and nowhere else can the tropics be seen in the natural untouched state as in this part of the country.

Between Km. 677 and Km. 679, there are three deep ravines crossed over by steel viaducts, and further on at Km. 683 a tunnel, 1,354 metres in length is entered. This is the Khun Tal tunnel, the longest in Siam. Immediately after the tunnel is the Khun Tal station, the highest point on the Royal State Railways (altitude 610.00 m.), on the line of watershed between the Me Wang and the Me Ping, the river draining Chiengmai. From Ban Tha Chompu (Km. 691.866) onward to Chiengmai, the track is practically level. Near to Ban Tha Chompu station is a large

ferro-concrete railway bridge, quite picturesque among its natural settings.

Lamphun (Km. 729.213) is reached within an hour from Ban Tha Chompu.

Lamphun and its surrounding districts have a population of about 132,000 people. Of all the cities of Northern Siam standing to-day, Lamphun is said to be the oldest. Reliable traditions ascribe its foundation between the VI and VIII centuries to the Môn settlers from Lavo. The city was ruled over by the Môn dynasty up to the thirteenth century, when it was captured by the Siamese.

Of the Môn period there is still in existence just outside of the western gate of the city, an interesting monument in a fair state of preservation, Wat Kukut. It is a laterite tower of square design, at the foot of which there is a Pali and Môn inscription of the early XIII century.

Among the many historical temples and monuments in Lamphun, the temple Wat Phra That Luang is the most important. This temple is in the heart of the city and can be easily visited. The temple dates back to the XI century, but has been repeatedly altered and enlarged since.

Of the town itself, Lamphun is small, cosy and quiet. Its streets are shady and its general appearance is quaint. The population is said to be more vigorous and active than the rest of the northerners and its young women, the fairest and prettiest. To the students of ancient history or to the archæologist, its ruins and its past are a mine of unending interest.

From Lamphun to Chiengmai, one may either proceed by road or rail. The journey by road requires about forty-five minutes, passing through a fertile and well cultivated country. On both sides of the road are rows of fine tall resin trees and every here and there are bits of beautiful mountain scenes and landscapes.

About half way to Chiengmai, is the large village of Pa Yang, where may be seen the remains of the fortifications of the ancient Wieng Kum Kam, the capital of the Thai chief who captured Lamphun and afterwards founded Chiengmai.

The journey by rail from Lamphun to Chiengmai requires less than 45 minutes. The distance is only 22 kilometres. The country on both sides of the line is practically level and covered with small wood trees.

Chiengmai, the second largest city of Siam, with its suburb has a population of about 350,000, the majority of which is Thai or Lao (the word Lao is sometimes used to designate the Thai population of Northern and Eastern Siam. This word is derived from the word Lava, the name of the original population of these regions). Chiengmai is a city of beautiful and interesting temples built on a broad and fertile plain watered by the clear stream of the Me Ping, one of the northern branches of the Menam Chao Phya. Chiengmai was founded in the 11th century by Meng Rai, the Thai chief. Subsequently it became the centre of a large kingdom, and very often the point upon which the struggles between Burma and Siam converged. The town is surrounded by massive wall and ramparts, and is the headquarters of the Lord-Lieutenant of the North-Western Provinces. It has well laid out streets and shady avenues.

Chiengmai is the most important centre of the teak industry. Being the capital of the North, it is naturally looked upon as the head station by several companies. The importance of the teak trade may be guaged from the extent of its export which in 1928 amounted to over nine million Ticals.

Like practically all other towns in Siam, one of the chief products of Chiengmai is rice. There still exists in this part of the country, an old system of irrigation by water wheels. In addition to rice, the other products grown are cotton, sugar-cane, indigo, beans, and all kinds of vegetables. The climate of Chiengmai is suitable for many species of cold climate plants. Chiengmai's rose is well known for its extraordinary size and colour.

A great number of Chiengmai's population engage in handicrafts, of which weaving, pottery and silverware and lacquer ware manufacturing are the leading ones. Visitors to Chiengmai seldom resist the temptation of purchasing some of these products, for souvenirs. The workshops where these products

are actually made can almost always be visited.

The American Presbyterian Mission has a large headquarters here also. The Mission manages a school, a hospital, a nurses' training school and a leper asylum. The works of the missionaries in Chiengmai have proved most beneficial to the population.

As already stated, Chiengmai has numerous temples and objects of interest for the visitor. Among the many temples, Wat Phra Singh and Wat Chedi Luang are the two outstanding ones. Wat Chedi Luang is important in that it was at one time the most important temple of Chiengmai, and ranks as one of the grandest in the whole of Siam, while Wat Phra Singh, which was constructed in the 14th century, is still maintained in an excellent condition. This temple contains a collection of fine buildings. The burial place of the ruling Chaos of Chiengmai at Wat Suan Dok is also of considerable interest.

From Chiengmai, there are highways leading out to several places of interest. The road to Doi Sudhep, the mountain overlooking the city is 6 kilometres in length. Huey Keo with its waterfalls may be reached within ten minutes, while the village of Meh Rim, 16 kilometres away, as well as that of Chom Thong, 30 kilometres, are also accessible by car.

The average height of the peaks in the neighbourhood of Chiengmai is 1,600 metres above mean sea level. The ground level in the city is 300 metres. Doi Intanon, 2,576 metres, the highest mountain within the boundaries of Siam, is about 50 kilometres south-west of Chiengmai while Doi Sudhep is 1,676 metres in height. Doi Chiengdao on the north and Doi Pa Cho on the north-east are 2,185 and 2,012 metres respectively.

All in all Chiengmai deserves at least four full days of the visitor's time. Its numerous attractions will supply the visitors with so many varied interests that the time allotted for sight-seeing and shopping will be fully occupied. The express trains from Bangkok arrive at Chiengmai on Thursdays and Mondays and leave the city on Tuesdays and Fridays. By this schedule, a stay of three or four days can be arranged without any difficulty. There is a good rest-house near the railway station.

The Eastern Line.

The opening of the Eastern Line of the Royal State Railways which runs from Bangkok to Aranya Prades has served to inaugurate an entirely new route for the traveller, an overland route from Penang to Saigon through Malaya, Siam and Indo-China that shortens the ordinary sea journey by several days.

The traveller journeys by train from Penang to Bangkok and Aranya Prades, and thence by motor road to Saigon, either via the famous ruins of Angkor or via Battambang, an old capital of Cambodia. The railway journey from Bangkok to Aranya Prades requires eight hours.

From Bangkok, the Eastern Line runs parallel to the Northern Line through the suburbs of Bangkok as far as the Petchaburi Road crossing. Here the Eastern Line turns to the right and continues on in an easterly direction.

The first stop from Bangkok is Makasan (Km.5.2) where the Makasan Shops of the Royal State Railways are situated. There are locomotive erecting and repair shops, a foundry, a smith shop and a general machine shop. Many of these shops are housed in modern buildings which are up-to-date in every particular. The number of employees in the shops totals over 2,400.

A short distance from Makasan, a line branches off on the right to the Menam Station where the railway wharf and one of the godowns are situated.

As soon as the train emerges from the maze of railway sidings and workshops, we are again in the vast plain of paddy fields. The stations of Klong Tan (Km. 10.0), Ban Hua Mak (Km. 15.478), Ban Tap Chang (Km.21.288) and Klong Song (Km.26.046) are passed successively at short intervals. Hua Takae (Km. 30.915) and Klong Luang Peng (Km. 40.035) are popular as snipe and duck shooting grounds, while Preng (Km. 46.584) is well supplied with fish.

Petriu, the largest town on the Eastern Line is reached at Km. 60.998. This town is the seat of the Lord Lieutenant of the Prachin Circle and also serves as an army headquarters.

Petriu has a famous temple called Wat Yasodhorn where

there is a very sacred image of the Buddha. A fair is held annually in November or December when people from all the neighbouring villages and towns come in to pay respect to the sacred image.

A motor road from Petriu to Cholburi and other towns on the east coast of Siam is now under construction. It is hoped that within the next few years this road will be completed and a considerable amount of trade and commerce will be forwarded from the various towns along the route to Bangkok via Petriu.

In the neighbourhood of Petriu, there are iron and lead deposits but none of these minerals have been seriously worked. Timber, rice and salt form the chief products of the town.

The country between Klong Bangkanak (Km. 79.045) and Yodhaka (Km. 93.742) is intersected by numerous canals which form part of the irrigation system of the fertile plain of central Siam. It is possible to journey through these waterways to Bangkok. There is a fine railway bridge near the station of Yodhaka.

At Ban Pak Plee (Km. 115.281) there is a road leading to the interior town of Nakon Nayok, passable in the dry season only. The next station from Ban Pak Plee is the old town of **Prachinburi** (Km. 121.781), a seat of a Provincial Governor. The town with its surrounding districts comprises about 75,000 people. The old city wall, partly demolished, is still in existence. Prachinburi's trade consists of hard wood, charcoal, rice, horns and hide. It is the headquarters of an army corps.

Eastward from Prachinburi, the next station of any importance is Prachantakam (Km. 137.662). Here there is a village of considerable size. Twenty-three kilometres further is Krabinburi, another important town.

Krabinburi is the seat of a Provincial Governor. The town with its surrounding districts has a population of about 40,000. Krabinburi's trade consists chiefly of rice, timber and a considerable quantity of guano.

The country between Krabinburi and Wathana is made up of several pa-deng forests. Here are to be seen several kinds of

wood-oil trees.

At Srakeo (Km.205.259) there is a grotto where in 1890 some ancient jewellery was found.

From Tha Kasem (Km. 216.285) and Wathana Nakon (Km. 233.860) there are overland paths to meet the North-Eastern Railway Line at Buriram and Korat.

The country around Tha Kasem is well known to sportsmen for the abundance of game. Deer and boars are very often found.

At **Aranya Prades,** the terminus, 6 kilometres by road from the Cambodian frontier, there is a Railway Rest House where passengers may find good accommodation and meals. Aranya Prades has served as the terminus for rail and road for many years. Its importance is rapidly growing due to the increased tourist traffic between Siam and French Indo-China.

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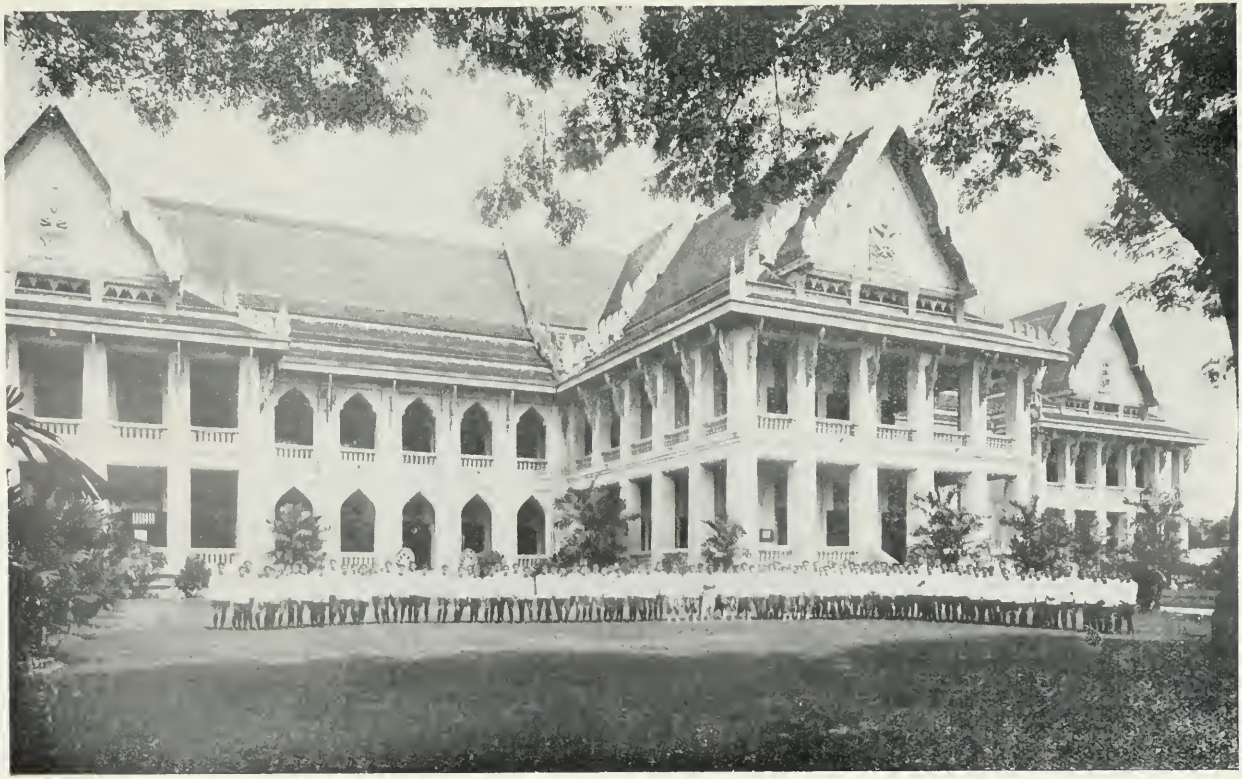


The Chulalongkorn University.

CHAPTER XI

EDUCATION IN SIAM

Introduction.

Before the advent some forty years ago of the idea of the State providing for the people's education, practically all the instruction within reach of the public was given in the monasteries. While, in accordance with Doctrine, the Buddhist monks hold themselves apart from political and commercial activities, they have, ever since the establishment of the Church in this country, taken on themselves the role of public school-masters. This work was one of pure philanthropy and abstract merit-acquiring, no payment in return being asked for or expected. Parents, it is true generally sent their boys to live with the teachers in the monasteries, with the object of repaying for the instruction received by personal service rendered. Such a service was, however, always voluntary; and probably it benefited the servant as much as the served. For in the monasteries, the boys would come in contact with more discipline, with more social intercourse with several others of their own age and with more of an atmosphere of learning and culture than they would have done at home. Such an education was naturally of a limited character. Reading, writing and perhaps arithmetic of the simplest kind were all the instruction that a boy would receive. The attendance would be irregular and the accommodation was limited. In those days, therefore, literacy was the exception rather than the rule, even among the male population.

Education in the sense in which it is now understood may be said to have had its beginning in the reign of His Majesty King Mongkut (1851-1868). His Majesty himself, before he came to the throne, had acquired partly by self-tuition and partly by the help of some American missionaries, a considerable knowledge of the English language, of Latin, of the world's Geography and

History, of mathematics and of some of the natural sciences, especially Astronomy,—this, of course, in addition to considerable scholarship in Pali, the Buddhist Scripture and Siamese literature. Although the time was not ripe for the organization of education on a national scale, the personal precept set by the King was of great moral and propagandic value, in so far as it aroused the interest of the princes and nobility in learning in general and in western sciences and foreign languages in particular. For the first time European tutors were engaged to teach the young princes; for the first time boys were sent to study in Europe; one or two secular schools made their first appearance; and Christian missionaries were given every facility and encouragement in their good work of instructing the people in modern knowledge.

Soon after his accession to the throne (1868), His Majesty King Chulalongkorn opened the first school under official control in Siam. It was an elementary school for sons and relations of princes and high officials, in which Siamese, arithmetic and government service methods were taught. Later on English for the more advanced scholars was added.

Educational reform is always a slow process in any country. Prejudice and, what is worse, indifference have to be broken down and enthusiasm aroused. Before there can be national education, the nation has first to be educated to have a taste for being educated. Such a task is a slow one. In Siam, it began less than forty years ago. At the present day it is by no means ended, especially in connection with higher education.

In about the year 1890 the first step towards education on a national scale was taken, when a Government Department of Education was inaugurated. First in Bangkok, and afterwards in the Provinces, primary schools were opened, most of which were founded upon the old monastery schools with monks as teachers, but with modified curriculum and organization. Thus the traditional close relationship between the Church and the people's education was preserved; the Departments of Ecclesiastical Affairs and Education were soon afterwards placed under the same Ministry, which is now called the Ministry of Public Instruction.

A Normal College for the training of teachers was opened in 1892; and at about the same time a purely secular boarding school under an English Headmaster was founded, where a secondary school standard was reached. The same standard was soon afterwards reached by some of the larger monastery schools in Bangkok. With the increase in qualified officials, who had been trained in Normal College or had been granted scholarships to study abroad, the Ministry of Public Instruction gradually extended its activities into the provinces, where by the beginning of the last reign (1910) there were resident Educational officers appointed to all Circles, and model schools with trained staffs were set up in various centres. In 1921 the Primary Education Act was promulgated and became enforced in all Circles except that of Bangkok.

With regard to the Higher Education, various Technical Institutes such as the Military School and the Law School were founded during the middle part of His Majesty King Chulalongkorn's reign. The University is a later development, out of the old Civil Service College, being founded by His Majesty King Rama VI. in memory of his father.

The Present System of Education.

There is a Compulsory Primary (Prathom) Course of:

(a) five years which comprises three years' general education and two years of general education combined with training in some trade or handicraft (vocational instruction) suitable to the District in which the school is situated. This is the compulsory minimum course according to the Primary Education Act B. E. 2464 (A. D. 1921).

(b) three years only for boys intending to proceed to the Secondary (Madhyom) Schools.

Under the above mentioned Act, the beginning of the school age is fixed at 7, with the proviso that, should local conditions render it necessary and advisable, this limit may be raised. The leaving age is fixed at 14, but, power is given to require scholars over 14, who have not attained a reasonable efficiency in reading and writing Siamese, to remain at school for a further

period, in order to reach the required minimum standard.

The Secondary General Course (Madhyom) is divided into three sections: the Lower Secondary (3 years), the Middle Secondary (3 years), and the Higher Secondary, which has three alternative courses, (1) general, (2) linguistic, and (3) scientific (for two years each). One foreign language is taught in the Lower and Middle Secondary School Courses, and two or more foreign languages in the Higher Secondary Course. The standard of the final Course is equivalent to the matriculation of most universities, and has been accepted as such by the Joint Universities Board in England.

The Secondary Special Courses are also divided into three grades: Lower, Middle, and Higher. The Courses, under the Ministry of Public Instruction are for (1) training of Teachers, (2) Arts and Crafts, (3) Commerce, (4) Agriculture, (5) training of Nurses and Midwives. Scholars can enter technical training at any time after having passed the Primary Course.

It is the aim of the education authorities to engage only qualified teachers whenever possible. Hence three training Colleges for men and women teachers are established in Bangkok. Since Siam is mainly an Agricultural country, vocational agricultural training is of first importance. In order to provide this training, the Ministry of Public Instruction runs a Central Agricultural Teachers' Training College at Tab Kwang in the Province of Saraburi, from which men, on completing their course, return to their Circles to become teachers in the Circle Schools for the Training of Teachers in Agriculture; these Circle Schools supply teachers in Agriculture to the other schools within the Circle.

A Central Arts and Crafts School in Bangkok gives training for teachers in drawing, basket-work, printing, carpentering, cabinet making, gold-smiths and silver-smiths works, and wood carving.

Higher Education is given in Chulalongkorn University which is composed of four faculties, viz., the Faculty of Medicine, the Faculty of Arts and Sciences, the Faculty of Political Sciences and Administration (Civil Service), and the Faculty of Engineering.

Debsirindra Secondary School.

The Faculty of Medicine and the Faculty of Arts and Sciences are organized with the co-operation of the Rockefeller Foundation. Attached to the Faculty of Medicine are the Nurse and Midwives Training School and the Siriraj Hospital, but the School of Pharmacy is attached to the Faculty of Arts and Sciences which is also responsible for the Pre-medical Course of two years. The University adopts the Final Examination of the Secondary Course (General Education) as its matriculation. The Faculty of Medicine attained the status of a Degree Course last year. The others are Diploma Courses.

Besides the University, Higher Education is given by the various technical and professional schools, e. g., the Military College, the Naval College, the Gendarmerie Officers' Training School and the Law School. They are not under the control of the Ministry of Public Instruction, but are run independently by their respective Ministries.

The entrance requirements of these Schools vary from the Standard of the Sixth Year to that of the Final Year of the Secondary Course.

Types of Schools.

Schools are of three types according to their management and control.

A Government School is one wholly maintained and controlled by the Ministry of Public Instruction. Most Government Schools are placed in some central situations in the different communes, towns and provincial cities, to act as model schools. Besides Government Schools run by the Ministry of Public Instruction, there are others run by the different ministries for their own special purposes, e. g. the Military College, the Naval College, the Law School, etc., as already mentioned.

A Local School is one managed by the local government, supported by grants-in-aid from the Government and controlled by the Ministry of Public Instruction. Local Schools come under the Primary Education Act B. E. 2464.

A Private School is either a school run as a private enterprise, or a school maintained and controlled by an individual or a

community. All Private Schools are governed by the Private Schools Act B. E. 2461 and must be registered at the Ministry of Public Instruction. The most notable examples of this type of schools are, the Vajiravudh College, a boarding school run on the line of a "public school" in England, founded by H. M. King Rama VI. (Vajiravudh); the Rajini School for girls founded by H. M. Queen Saovabha; the Assumption College of the French Roman Catholics and the Christian High School of the American Presbyterians. Of late years the number of Chinese schools has increased rapidly.

Scholarships.

The following may be cited as examples of scholarships granted: (a) exemption from school fees is conceded to scholars of good scholastic records, in Government, Local, or Private schools; (b) a diligent scholar who is not absent from school three years in succession is exempted from school fees; (c) in the case of three children of the same parents attending school at the same time, the third is exempted from school fees; (d) an open examination for "King's Scholarships" takes place each year for scholars under nineteen years of age, the two candidates obtaining the highest marks and of good character and health are sent abroad for further studies for five years, financed by the Ministry of Public Instruction. In addition to these, another scholarship, entitled Science Scholarship, was founded this year, the fund being provided out of His Majesty's Privy Purse; (e) other Ministries also give scholarships to promising students sending them abroad to study some special subjects for their own requirements; (f) the University grants several entrance scholarships, research scholarships and fellowships for advanced study abroad, some of which are financed by private donations, some by the Rockefeller Foundation and some by the University itself.

Supplement to Education.

The training of the Boy Scouts and that of the Junior Red Cross play an important part in supplementing the practical side of education in this country. The Boy Scout Organization was founded by H. M. King Rama VI. and is under the Presidentship of H. M. the King. Its membership numbers some 43,000 scouts

Jainad Agricultural School.

in active service. The Junior Red Cross which is of more recent creation with a membership of over 34,000 is a branch of the parent Siamese Red Cross Society.

Comparative Tables For 10 Years.

(a) Scholars and Teachers in all schools under inspection:

(B. E. 2462—B. E. 2471)

Year B. E.	Year A. D.	Scholars (Boys and girls)	Increase in Scholars on previous year	Percentage increase each year	Teachers	Increase in Teachers
2471	1928–9	625,741	43,774	7.52	14,544	643
2470	1927–8	581,967	– 8,428	– 1.46	13,901	403
2469	1926–7	590,395	–33,632	– 5.39	13,498	– 244
2468	1925–6	624,027	19,028	3.15	13,742	582
2467	1924–5	604,999	19,376	3.31	13,160	877
2466	1923–4	585,623	137,243	30.60	12,283	2,542
2465	1922–3	448,380	206,872	85.66	9,741	2,796
2464	1921–2	241,508	39,843	19.75	6,945	809
2463	1920–1	201,665	14,164	7.55	6,136	599
2462	1919 20	187,501	9,449	5.30	5,537	262
2461	1918–9	178,052	..	..	5,275	—
Increase in 10 years		447,689		Increase in Teachers		9,269

Note: B. E. 2465 was the first year the Law of Primary Education was put in force.

(b) Comparative tables showing increase in Girl Scholars during 10 years.

(B. E. 2462—B. E. 2471)

Year B. E.	Year A. D.	Total number of Girl Scholars	Increase each year
2471	1928–9	239,150	19,448
2470	1927–8	219,702	— 2,096
2469	1926–7	221,798	— 13,952
2468	1925–6	235,750	17,189
2467	1924–5	218,561	8,903
2466	1923–4	209,658	77,894
2465	1922–3	131,764	107,708
2464	1921–2	24,056	9,426
2463	1920–1	14,630	1,350
2462	1919–20	13,280	2,196
2461	1918–9	11,084	
Increase in 10 years 228,066			

Schools in Monasteries.

The following figures show the very close connection between the Schools and the Monasteries, a connection which has been existing from ancient times.

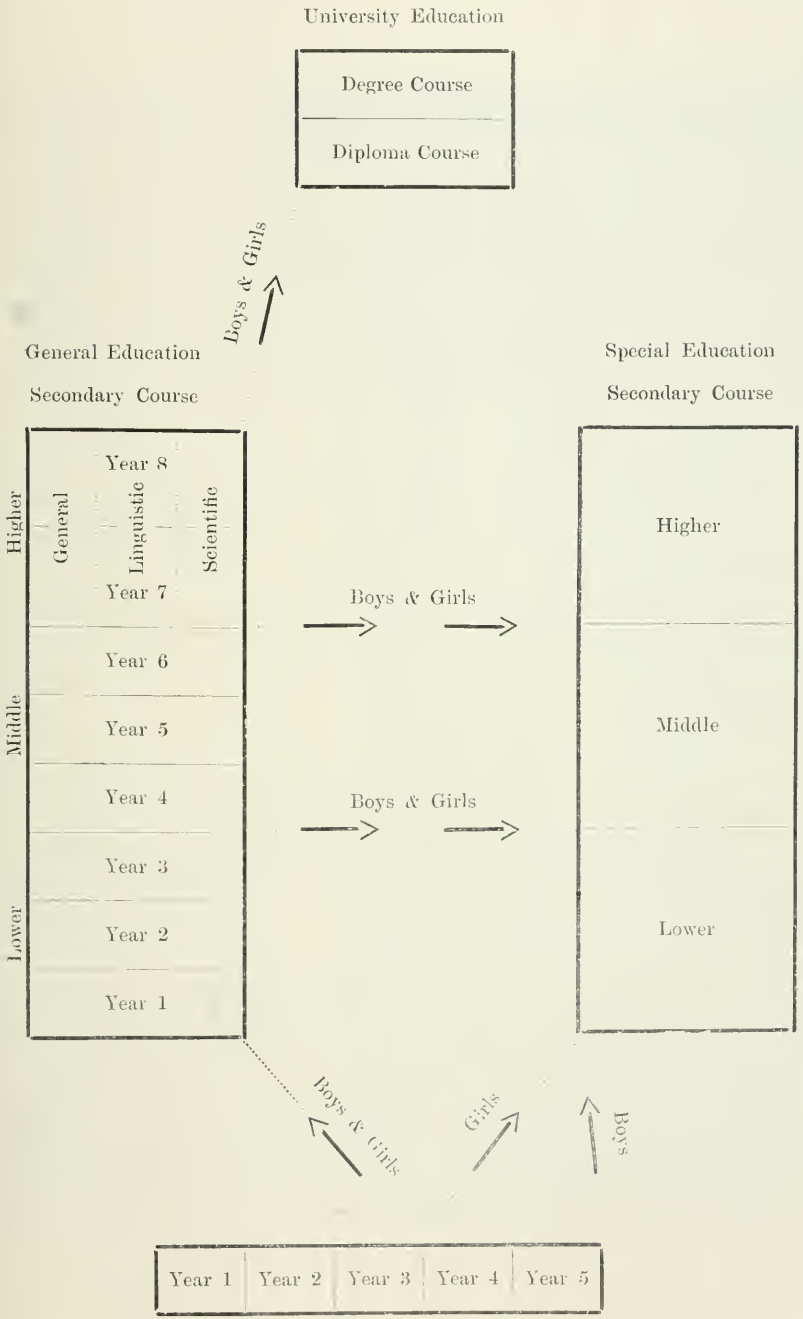
B. E. 2471

Class of School	Total number of Schools	Number of Schools in Monasteries	Percentage of total in Monasteries.
1. Government	276	81	29.34
2. Local	5,362	4,379	81.66
3. Private (Registered)	903	39	4.31
Total	6,541	4,499	68.78

Boy Scouts of Nagor Rajsima.

"Juniors" in a Day Nursery.

The System of Education.



CHAPTER XII

MEDICAL EDUCATION

Siam has one medical school, the Faculty of Medicine of Chulalongkorn University. It is situated on the west bank of the Menam Chao Phya in the compound of Siriraj hospital, some four miles from the University campus. As a Faculty of the University it is under the jurisdiction of the Ministry of Public Instruction.

The teaching of medicine began at this hospital in 1889 (B. E. 2432), and the first class of nine members was graduated in the early part of 1893. The name of Medical School was officially given to the course of instruction in 1901. The course was three years in length until 1902 when it was increased to four. In 1911 it was made five years and in 1915 six years. In 1917 the School was amalgamated with the University as its Faculty of Medicine.

A reorganization of the School began in 1923, this being made possible by Government appropriations, by local contributions, and by the co-operation of the Rockefeller Foundation. The changes included for a period of years the presence of six visiting Professors to organize the six major branches of the Faculty, namely, Anatomy, Physiology (including Biochemistry and Pharmacology), Pathology (including Bacteriology), Medicine and its specialties, Surgery and its specialties, Obstetrics and Gynecology. Entrance requirements were raised to the 8th (final) Madhayom of the Government Secondary Schools with the addition of two years of college work in Physics, Biology, Chemistry and English. These two premedical years are given in the Faculty of Arts and Sciences, which is also being reorganized with the aid of visiting Professors. The four-year medical course is given at Siriraj hospital.

The building programme that is a part of the scheme of re-

Anatomy and Physiology Building.

organization includes the erection at the University of science laboratories for the Faculty of Arts and Sciences, and laboratories of Anatomy, Physiology, Biochemistry, Pharmacology and Pathology for the medical school at Siriraj hospital. The old buildings of the hospital are also being replaced by new ones. An Administration building contains offices for the entire institution, record rooms for the hospital, a medical library of 2,100 volumes, a reading room containing 78 current medical journals, the out-patient department, the dispensary, and an assembly room seating 300 persons.

The Dean of the Faculty of Medicine is also the Director of Siriraj hospital. The other members of the administrative and clerical staffs of the school and hospital also are common to the two, which makes them from a business standpoint a single institution. The staffs of both laboratory and clinical departments of the Medical School are the corresponding staffs of the hospital. With the buildings of the two in close proximity in a small compound and the management and staffs identical, the hospital is used to the fullest extent in the clinical teaching of the school.

The curriculum for the four years of the medical course has a total of 4,620 hours and about 4,400 actual teaching hours are given. Sessions begin on May 17 and end about March 15. The year of 35 weeks is divided into three terms of 11, 11 and 13 weeks respectively, the lengths being determined by the occurrence of certain National holidays. The daily hours are 8 : 30 to 11 : 30 A. M. and 1 to 4 P. M. and on Saturday 8 : 30, to 11 : 30, giving a week of 33 hours.

Instruction is given under the six major branches and their specialties as before mentioned, and also in two departments not yet raised to faculty positions, namely, Roentgenology and Hygiene and Public Health. The latter is for the present taught by a staff of five, two of the medical faculty and three physicians from the Department of Public Health in the Ministry of the Interior, who are permitted thus to aid in the instruction. The students thus get most of their teaching in this subject from men who are actively engaged in public health work.

Instruction in Anatomy and Physiology occupy the first year. The work in the former is based on the correlation of gross and microscopic anatomy and embryology in such a way that the three are given consecutively for each organ instead of making each into a group as usual. As the subjects of biochemistry and therapeutics are under the department of Physiology, they have been merged with it so that they are taught as parts of physiology instead of as separate subjects.

Pathology, with bacteriology and parasitology, largely occupies the second year, though anatomy and physiology are finished and medicine and surgery begun. *Prevention* of disease is emphasized. The clinical years are spent largely in the wards and out-patient department, the fourth year especially having a minimum of lectures.

Final examinations at the end of each year are given by the heads of departments and the grades reported to the Dean. These grades are considered individually at a meeting of the Faculty (of which the Dean is Chairman), that body deciding on promotion, reexamination, repetition of a year, or dropping from the school as the work of each student indicates.

Members of the teaching staff in all departments now number thirty, with several positions not yet filled. In addition there are six house officers and four student assistants.

Students average about twenty to the class. Women first began the study of medicine in Siam in 1929, the first and second year classes now having six. The ages of the men range from 17 to 24 years; of the women from 19 to 22.

Graduates of the Faculty of Medicine (beginning with the session of 1928-9) are given the degree of M. B. (Bachelor of Medicine). Provision is made whereby the holders of this degree may later, by meeting requirements laid down by the Faculty, obtain the degree of M. D.

CHAPTER XIII

PUBLIC HEALTH AND MEDICAL SERVICE

Historical Summary.

Evidence is not lacking that disease has played an important part in shaping the course of Siamese history. Even before the Tai people penetrated the Khmer Empire, which in the first century of the Christian Era extended throughout the Indo-Chinese Peninsula, outbreaks of pestilence among their enemies had in A. D. 750 and 754 materially assisted them in repelling the Chinese invaders from Nanchao, their original country, thus retarding their own entry into Siam for almost a hundred years. During the period of Khmer hegemony it may be gathered from historic remains in some of the walled towns that consideration was given to sanitation as then understood. In 1350 the foundation of Ayudhya, which for over four centuries remained the capital of Siam, was directly due to an epidemic which caused the abandonment of U-Thong, a previous metropolis.

The first definite mention of cholera in Siamese history was 1357; while in 1534 smallpox was recorded as having caused the death of Paramaraja IV. Plague was, however, of much more recent occurrence, and was probably introduced from India in 1904.

As is to be expected, the indigenous arts of healing are derived from the empirical methods of India and China modified by local usage. The first medical missionary from Europe arrived in 1676 in the person of a Jesuit who was installed in a hospital established by King Narayana. Western methods of treatment had probably been introduced into the country previous to this through contacts with the Portuguese dating from the beginning of the sixteenth century, and later with the Dutch and the English.

Very early in the eighteenth century Siam suffered from a

severe famine and drought. The Chao Phya River was covered with "an evil-smelling green slime." Sickness broke out, and the authorities, apprehending an epidemic, forbade the people to drink it. As no other water was obtainable, "the people became restless and rebellion was imminent. Thereupon it was announced that the god Indra had appeared at the city gate and had declared that the green scum was a panacea for all the diseases in the land. The whole populace rushed to the river to anoint themselves with the scum and the polluted water."* Heavy rains however saved the situation. This is the authentic indication of a subtle public health policy in the past. Siam became greatly depopulated about this time as the result of continuous wars. During the final siege of Ayudhya by the Burmese, the resistance of the inhabitants against their enemies, both human and microscopical, was so reduced by starvation that they became easy prey to an epidemic, "and the streets were strewn with corpses, which were left to be devoured by the pariah dogs."* Ayudhya was sacked and razed to the ground on April 7th, 1767, and thus for the second time disease was a contributory cause of the setting up of a new capital for the country, namely the present city of Bangkok.

The advent of the American missionaries in the first half of the last century was soon followed by their medical missions, who first practised arm-to-arm vaccination against smallpox in 1840, and later manufactured bovine lymph until the product of the Government became freely available. They established at Chiengmai the first institution for lepers in this country which receives a grant-in-aid from the Government.

One of the first attempts to deal with leprosy in Siam was the designation of a remote village for the segregation of lepers by one of the northern Rulers. No compulsion has been used for the last few decades, and yet the population of the village still consists largely of persons afflicted with this disease who appear to be reasonably contented. Such villages or "leper colonies" also exist in the eastern provinces. They are considered as promising guides to future efforts in dealing with this as well as

* A History of Siam by W. A. R. Wood, C.M.G., C.I.E.

other analogous difficult social-hygienic problems on a national scale, due regard being given to economical ways and means.

In 1889 the opening of the Siriraj Medical School marked the beginning of public medical education along scientific lines. Upon this has been built the present well equipped school with its highly qualified full-time Medical Faculty through which medical training in this country is rapidly approaching the highest standards. This advancement of medical education which has been made possible by the co-operation and assistance of the Division of Education of the Rockefeller Foundation, is recognised as indispensable for the development of both the public health and medical service of the nation.

As in many countries, the first incentive to public health work appears to have been a desire to combat epidemic diseases, for even within living memory both smallpox and cholera have wrought terrible havoc among the population. Unfortunately few reliable records exist as to the actual number of deaths in the absence of organised notification. From various accounts it may be gathered that efforts were directed towards relief rather than prevention. Among the first steps in the latter direction was the appointment of an American physician then practising in Bangkok to supervise the sanitary conditions of the city. Not long after this, in 1897, what may be termed the first public health law was promulgated providing, among other things, for a medical officer of health and a city engineer. This was the Local Sanitation Enactment of R.S. 116; and it begins with an interesting preamble from which the following extract of the translation may be quoted :— ". . . it appears advisable as a first step towards the preparation and execution of a complete and permanent scheme of sanitation in the City of Bangkok to appoint sanitary officers who under the supervision of Our Minister of Local Government shall gradually carry out such sanitary works as will be hereinafter enunciated and who under the same supervision shall inquire into the general conditions of the City so as to be able to propose from time to time such regulations to be made and such works to be put into execution as may be conducive to an improvement of the

sanitary conditions as also to the general embellishment and amenity of the Capital." It still remains to this day the basic sanitary law for Bangkok.

Maritime Quarantine was instituted from time to time by Royal Decree between 1901 and 1905 when a permanent quarantine station was established on the island of Phra, the Medical Officer of Health of Bangkok being appointed as Port Health Officer.

About this time the Government Medical Depôt and Vaccine Laboratory were started in the Ministry of Public Instruction, being the authority in charge of medical education. These were later transferred to the Ministry of the Interior, the latter establishment being combined with the newly founded Pasteur Institute in 1911. With this nucleus the Medical Department of the Ministry of the Interior was formed. It was the forerunner of the present national health organization. Its activities were at first confined to the supervision of strictly medical matters of the interior provinces, and apart from the occasional combating of epidemic diseases and vaccination against smallpox, it was largely concerned with medical service to provincial officials and prisons. It dealt, however, with the medical supplies of the various government departments as well as those of the provincial hospitals and dispensaries, over which it exercised a technical control. It also prepared and supplied eight simple remedies for the use of people in the provinces.

In 1909 the Provincial Sanitary Organization Law, R. S. 127 was gazetted. It created Sanitary Boards for towns and other communities whose duties under the provisions of Section 4 were (1) the maintenance of cleanliness, (2) the *prevention* and treatment of diseases and (3) the upkeep of the roads. The supervision of these Sanitary Boards was not entrusted to the Medical Department until 1915 from which may be dated the inception of the national public health policy of to-day. This will be dealt with under other headings.

In 1911 the Siamese Red Cross Society assumed control of the Pasteur Institute, already combined with the Government

Vaccine Laboratory, and upon this foundation built the Queen Savabha Memorial Institute which now serves as the vaccine and serum laboratory of the Central Health Authority. The Society, the International Health Board and the Division of Medical Education of the Rockefeller Foundation have been important factors in the recent medical and public health progress of Siam.

Negotiations between the Royal Siamese Government and the International Health Board dated back to April 1915. Since then joint projects have been carried out by the latter with the Medical Department, the Siamese Red Cross Society and the present health organization of the Government. These activities in which the Board participated became later known as the "Sanitary Campaign", the influence and effect of which was of such great value that it deserves a special account in this brief record of the "public health movement" in Siam.

In 1918 the present Department of Public Health was instituted by Royal Decree to supervise the medical and public health services both of the Capital and of the Provinces. Certain national health activities which theretofore had been carried on by the Ministry of Local Government were assigned to the Department which gradually assumed other functions of this nature. After the amalgamation of the Ministry of Local Government with the Ministry of the Interior, the Office of the Medical Officer of Health of Bangkok was placed under the direct control of the Department of Public Health in 1925. This was admittedly an expediency to raise the standard of the medical and health work of the Capital pending its ultimate re-organization as a self-supporting municipality.

The Medical Council was created under the Medical Act of B. E. 2466, two years previous to this; while in 1928 the long projected National Health Council was finally instituted by Royal Decree. These Councils form part of the machinery of the Ministry of the Interior, the Director General of Public Health being *ex-officio* president of both bodies.

Thus it will be seen that the centralization and co-ordination of the public health and medical functions of the State is fairly

complete.

The Sanitary Campaign.

A campaign for the relief and control of hookworm disease began in February 1917 in response to an invitation extended to the International Health Board by the Royal Siamese Government. Headquarters were first established in the North at the town of Chiengmai. In order to secure greater flexibility necessary for rapid expansion, the undertaking was transferred, through the recommendation of the Medical Department, to the Siamese Red Cross Society in 1920, a special division of the Society, subsequently called the "Health Section", being created for the purpose. A general hookworm survey and considerable health propaganda was conducted in forty-four out of the seventy-nine Provinces of Siam. At the close of a three year period of co-operation both organizations realized that, to guarantee the permanency of results then achieved, it would be advisable to carry out further developments under the Department of Public Health. The retransfer of the work from the Society to the Government was effected in September 1923, and a five year arrangement was made by which the Government gradually assumed full financial responsibility.

This affords an illustration of the important rôle played by the Siamese Red Cross Society in undertaking social-hygienic and other scientific work of an experimental nature which, with its greater advantages in enterprise and flexibility of control, the Society is able to develop with the intention of ultimately handing it over to a government department. This pioneer work is invaluable in view of the more conservative financial methods of the latter.

The "Sanitary Campaign", thus forming a division of the Department of Public Health, consisted of nine field units. The administrative staff was located in Bangkok, while five Extensive Units, largely devoted to hookworm control, were scattered in the interior districts. There were, in addition, a Health Boat Unit, an Intensive Unit, an Educational Unit, a Laboratory Unit and a considerable number of sanitary inspectors who were permanently placed, or anchored as it were, in the wake of the control work.

The International Health Board assigned two representatives to Siam, and the total personnel of the Campaign numbered over two hundred employees at one period of its activity.

Well over a million treatments for hookworm disease have been given in Siam, thereby affording relief to a considerable percentage of the population whose vitality and efficiency were being sapped by this insidious parasite. Where soil pollution was prevalent thousands of latrines have been erected, establishing there "a veritable fortification against reinfestation" and against all infectious intestinal diseases which, in this country, include cholera, dysentery and typhoid fever.

By means of the Intensive Unit a local health organization scheme has been developed at Lopburi in close co-operation with the Sanitary Board of the town. This was begun in December 1924. The plan was to foster as complete a system of health work as local resources will permit, which should serve as a model for other communities. A special census of the population and a thorough health survey were carried out as a preliminary to a close study of the existing conditions. Popular health education in all its forms was utilized to the utmost both before and after each phase of the work in order to ensure full understanding and co-operation on the part of the inhabitants. To the dispensary service of the Sanitary Board was added maternal and infant welfare work, and the local health personnel were given a special training. This work which is nearing completion, and is being transferred to another town, is regarded as a useful experiment from which invaluable data have been obtained giving insight into the important problem of local health administration.

In consequence of the work of the Intensive Unit, the Laboratory Unit was formed. It consisted of a bacteriologist, his assistants and necessary equipments. The purpose of this itinerant laboratory has been to introduce laboratory methods into health work in the interior and to stimulate interest among the local health officers from which local research may be developed in the near future.

Owing to the special dispensation afforded to the Sanitary

Campaign by the financial authority, the Health Boat Unit has owed its existence since 1925. Its duty has been to minister to the large riparian and floating population of the Chao Phya River, estimated at not less than a million souls. "Health Boat 1" is approximately sixteen metres long with a three metre beam, and is equipped with a cinematographic projector and other educational materials. It has its own motor power and electric light plant, and tows a house-boat in which the health crew live. It is also fitted out as a dispensary by means of which a population, which is practically inaccessible by other means of travel, has been reached with educational and remedial measures. This cruiser of public health is considered as a valuable reinforcement to the land forces operating against disease in Siam.

The part played by the Campaign in health education will be mentioned in conjunction with the general work of the Department of Public Health along these lines. It should be recorded here, however, that during the five years of its activity, the major part of the educational work of the Department has been entrusted to its care, and that the annual courses of instruction for health officers and sanitary inspectors were first organized through its means respectively in 1924 and 1925. In this connection it should also be mentioned that a number of fellowships for the study of preventive medicine in the United States have been granted by the International Health Board to promising health officials in Siam who were recommended by the Government. All these have succeeded in obtaining the degree of Dr. P. H., and are holding responsible posts. The significance of such a training for the health development of the country may be readily appreciated.

Beside these activities, the Sanitary Campaign, in the course of its field work, gave instructions regarding malaria to local medical practitioners and the general public in the malarial districts visited, and a large number of cases of the disease have also been treated. During the world-wide epidemic of influenza in 1918, the entire personnel of the anti-hookworm work participated in the general efforts of prevention and relief; while in 1921 a unit of the Campaign gave effective assistance in carrying out

A State Procession at the ceremonial "Top-knot" cutting of a Royal Princess

Campaign by the [illegible] authority, the Health Boat Unit has owed its existence since 1925. Its duty has been to minister to the large floating population of the Chao Phya River, estimated at [illegible] than a million souls. "Health Boat 1" is approximately fifteen metres long with a three metre beam, and is equipped with a cinematographic projector and other educational [illegible]. It has its own motor power and electric light plant, and is a house-boat in which the health crew live. It is also fitted out as a dispensary by means of which a population, [illegible] practically inaccessible by other means of travel, has been [illegible] educational and remedial measures. This cruiser of public health is considered as a valuable reinforcement to the land [illegible] operating against disease in Siam.

The part played by the Campaign in health education will be mentioned in conjunction with the general work of the Department of Public Health along these lines. It should be recorded here however that during the five years of its activity the major part of the [illegible] work of the Department has been entrusted to its care and that the annual courses of instruction for health officers and sanitary inspectors were first organized through its [illegible] respectively in 1924 and 1925. In this connection it should also be mentioned that a number of fellowships for the study of preventive medicine in the United States have been granted by the International Health Board to promising health officials in Siam who were recommended by the Government. All these have succeeded in obtaining the degree of Dr. P. H., and are holding responsible posts. The significance of such a training for the health development of the country may be readily appreciated.

Besides these activities, the Sanitary Campaign, in the course of its field work, gave instructions regarding malaria to local medical practitioners and the general public in the malarial districts visited, and a large number of cases of the disease have also been treated. During the world-wide epidemic of influenza in 1918, the [illegible] staff of the anti-hookworm work participated in the general [illegible] prevention and relief; while in 1921 a unit of the Campaign gave effective assistance in carrying out

A State Procession at the ceremonial "Top-knot cutting of a Royal Princess.

anti-plague measures in the town of Lampang.

It cannot be sufficiently emphasized that the relief and control of hookworm disease, which led to the organization of the Sanitary Campaign, has been more than an end in itself. It has lent itself well for the purpose of demonstrating the cause, the mode of transmission, the cure and means of prevention of a large and important group of diseases. Indeed it has been a means of teaching the public the modern scientific conception of preventive medicine and thereby arousing in them the latent humanitarian spirit which has been aptly termed "the public health conscience." For the national health organization itself it continuously served as an effective wedge in its endeavour to shift the colossus of passive resistance, and at times as a magic weapon against the hydra of active opposition, the one an offspring of ignorance, the other of misunderstanding.

Public Health and Local Government.

As may be seen in the appropriate part of this volume, the general system of local administration of the Kingdom is of necessity highly centralized in its nature. It is carried on by the Lords Lieutenant of Circles (the Lord Prefect, in the case of the Metropolitan Area), Governors of Provinces and District Boards in accordance with the general provisions of the Local Administration Law. The Headmen of Communes with their deputies, the Commune "Medicos", mostly practising the empirical art, and the Village Elders are chosen by the people with the approval of the Local Authorities. The powers and duties of the above as regard health matters are dealt with under the following heading of Legislation, the Department of Public Health exercising technical control through their local representatives, the Health and Medical Officers.

The Sanitary Boards, which are given a measure of local self-government under the provisions of the Provincial Sanitary Organization Law, are at present technically and financially supervised by the Department of Public Health acting on behalf of the Minister of the Interior who, with the assistance of the Lords Lieutenant, has charge of the execution of the law. The Sanitary

Boards of towns, consisting of five official members and four Headmen, are presided over by the Governors of the Provinces in which the Sanitary Areas are situated; while those of smaller communities, which consist of three official members and two Headmen, have the District Officers as their Chairmen. The local house-duty, certain licence fees, rents and other income, derived from the economic undertakings of the Boards, form their present modest revenue from which the salary of their employees and general expenses are paid.

Although primarily conceived for the purpose of sanitation in its narrower sense, these organizations have, in course of time, assumed certain delegated governmental functions and have undertaken various corporate activities generally of the nature of such public utility as the supply of water and electric power, the management of the public market and slaughter house, for which the ability to raise loans has recently been conceded to them. They employ health officers and other physicians and support hospitals or dispensaries. Many of them also employ nurse-midwives for infant and maternal welfare. The development of these Sanitary Boards into municipalities with greater fiscal and administrative autonomy is regarded as of great potential value for the progress of both the public health and the public medical service of the nation.

The course of their progress for the last few years indicates their future development along lines which should include the three essential functions of local government, namely those of *health*, *safety* and *convenience*.

It is usual in other countries to entrust to such local bodies the power of issuing bye-laws; and the introduction of local rates assessed on the annual value of land and buildings should replace the present somewhat antiquated tax on houses. This would introduce a system of local taxation in accordance with real capacity to pay, and would incidentally put a premium on dwelling houses of a higher sanitary standard. The raising of local loans should be further encouraged for the purpose of general sanitary improvements. Infectious diseases other than the four at present

notifiable by law may be brought under control in the near future; while the recording of births, deaths and general morbidity may be made with a considerably greater degree of accuracy. The question of water, food and drugs, of markets and slaughter houses are of paramount importance. General sanitary regulations, the prevention and abatement of nuisances, especially those affecting health, a more efficient method of disposal of waste materials, the power to deal with insanitary buildings, overcrowding with humanity or goods, common lodging houses and obstructive buildings would all tend to raise the standard of community life. Better control of the construction and maintenance of streets, buildings, back-lanes and of the clearing of open spaces is indispensable; and adequate provisions for the financing and execution of improvement schemes as well as town-planning, with a view to future growth, is considered of the utmost importance.

As regards public safety, there is an urgent need for well organized fire brigades with suitable equipments as well as for up-to-date signalling systems; while the exigencies of modern traffic call for well trained forces of municipal police to enforce its control. The relief of the poor, the aged as well as those afflicted with incurable and disabling diseases, including lunacy and mental deficiency, may at first be made a local duty and possibly financed by means of the net proceeds of municipal pawnshops as has been done elsewhere. Provisions for public convenience, which more often than not usurp the position that should be occupied by more necessary or useful public services, should be given such place in the scheme as may be justifiable by their relative value as means for better health. Thus public latrines, urinals, baths, wash-houses, parks and play grounds may be given their precedence.

The institution of municipalities as they have been above envisaged would further the general ends of government, and would be an additional means of fulfilling the aims of primary education without which public health, in the modern sense of the word, is an impossibility.

In this connection it may be of interest to quote the following

passage from a letter written to the present Director General of the Department of Public Health in July 1928 by Sir George Newman, Principal Medical Officer of the English Ministry of Health :—" We in England have rather continuously held the view since the early part of the nineteenth century that the central office dealing with health should also deal with local government, partly because health is, in fact, administered by the Local Authorities, and partly because of the principle that public health and local government are inseparable. The alternative is unthinkable in practice, namely, to have a Ministry of Health which is *only* health in the abstract or medical service in practice. To make health actual and to dovetail medical services in the whole system of Government, it is essential that the central department should deal with both, though it may subdivide itself into sections for its respective functions." This evidently justifies the present position of the Department of Public Health as far as the future development of local self-government is concerned.

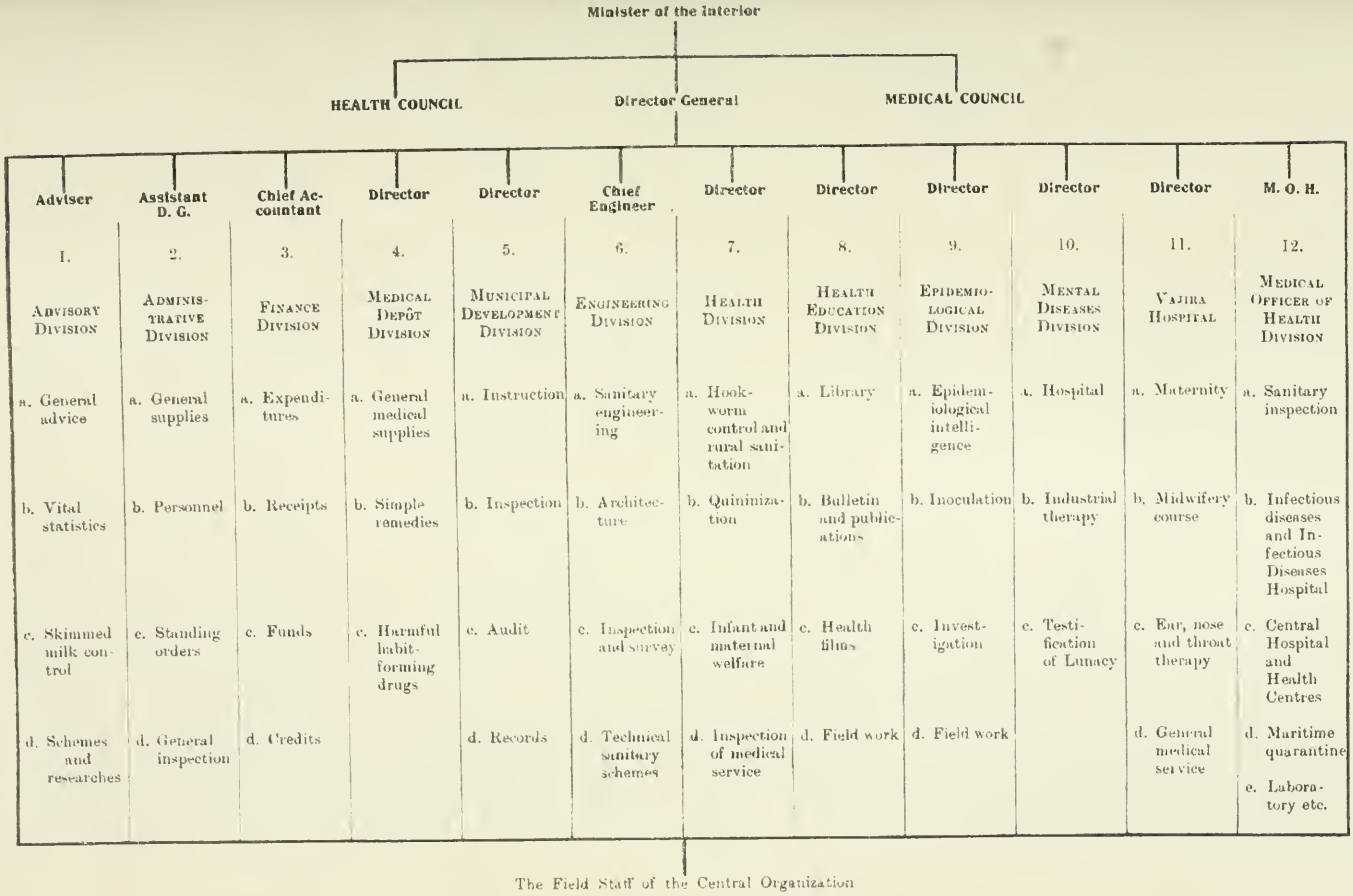
The Central Organization.

Notwithstanding references to the Department of Public Health as the national health organization, it should be understood that the Minister of the Interior is the superior health authority and that the final responsibility for the public health and public medical service of the Kingdom rests upon him. The present organization of the Department is indicated in the appended diagram, showing the various divisions and sections, the actual principal functions of which are thereby indicated.

The Advisory Division is somewhat different to the others in that it is, in principle at least, of a temporary character, and is usually made responsible for activities needing organization and special attention for development, later to be assigned to other divisions or to be formed into entirely new ones.

The Sanitary Campaign serves as a good illustration of such a process of what may be described as crystallization of functions During its existence it formed a distinctive division of the Department. Upon the termination of the five year arrangement made between the Government and the International Health Board and

DIAGRAM OF THE CENTRAL ORGANIZATION OF HEALTH AND MEDICAL SERVICE.



The Field Staff of the Central Organization

the assumption of the full financial burden by the former, the Campaign was liquidated and its activities was assigned to different divisions in April 1929. Thus the Divisions of Health Education and Epidemiology were formed out of its personnel and resources, while four out of the original nine Units were retained by the Health Division, which was also made responsible for the technical supervision of the sanitary inspectors, appointed as part of the programme of the Campaign, and now forming a regular part of the local health staff. A certain number of these are employed by the Sanitary Boards while the remainder as well as a considerable number of additional recruits are paid by the central department mostly from the "Sanitary Campaign Fund" which remains at the original annual figure of 90,000 Baht (approximately £8,180) appropriated for the purpose at the outset. These scions of the Campaign are thus permanently grafted as it were on the stocks of local health organization.

It has been stated under the heading of Public Health and Local Government that the department exercises technical control of local matters affecting the public health through the Health and Medical Officers. With the exception of a small minority employed by the Sanitary Boards, all these officials are actual members of the staff of the central department, or to be more precise, these medical men, subject to certain concessions made to the Local Authorities as regard discipline and local transfers, are appointed, assigned, or promoted and in some cases degraded or dismissed by the Central Authority who also provides for their salary.

The rapidly growing demand for the services of the Divisions of Municipal Development and Engineering of the Department is one of its present most important features. For an organization devoting itself almost entirely to "medical service in practice," and consequently to "health in the abstract," the inclusion of such activities as are implied by the names of these divisions would be entirely out of place. A stereotyped public health policy that fails to grasp relative values and take proper means to attain practical ends would be an abstraction indeed! The concrete fact,

however, remains that the aspirations of uneducated human nature, especially as exemplified by the ubiquitous cheap building contractor, who dares to venture where not only a qualified but an expert engineer or architect fears to tread, is responsible for most of the existing insanitary surroundings. As is invariably the case, what prevails in the towns is promptly adopted by the rural districts. It was such emulation of the high by the low, the rich by the poor and the sophisticated by the simple that first inspired the Department with the idea of closely interesting itself with the construction of public buildings, places of popular resort and prisons, not omitting the residences of government officials in the provinces. Such more obvious works as slaughter houses, drains and water-supplies of the interior are within its sphere as a matter of course. Then again there are certain kinds of structures and works that are of special significance to health in this country. Such things as barns, wells and latrines, to cite but a few examples, are of importance as models. It will thus be seen that the engineers and architects of the Department are carrying out works of considerable educational value apart from direct utility.

The present financial circumstances of the Sanitary Boards do not permit, with two exceptions, of their employing men who are better trained to supervise their technical services than the present factota, the "Palad Sukhabhipal" or Sanitary Board Deputies. Unless and until this can be attained, and qualified sanitary engineers and architects appointed in all the interior towns of any size, the advice and assistance of the central Engineering Division is indispensable. But even with the realisation of this ideal, the essential function of this division yet remains, namely the supervision of local sanitary schemes in order to guarantee that their standards do not fall below what may be considered from time to time as the national permissible minimum. The urgent problems of town-planning and building regulation as well as the equally desirable provisions for regional planning and better housing cannot be approached without some such central technical organization which must work in close touch with its sister divisions dealing directly with local finance and preventive medical matters.

Fully to understand the somewhat complicated working of the administrative health machinery of the Metropolitan Area, it must be recalled that its general administration is under the Lord Prefect, who is an official of the Ministry of the Interior. The Area is divided into Inner and Outer Districts, the distinction being based upon greater specialization in the functions of the Police and the District Officers in the former, which also form the Registration Area and are designated for health and epidemiological purposes as "the City." The latter are administered in practically all respects like the districts of the interior. Lying within the Inner Districts, and only on the east side of the Chao Phya River is the Bangkok Sanitary Area. It is not administered in health and medical matters by a Sanitary Board as in the case of an interior Urban Sanitary Area but, at the present time, by two *central* government departments, namely the Department of Public Health and Department of Municipal Affairs, both under the jurisdiction of the Minister of the Interior.

Among the functions of the Department of Municipal Affairs are the general public works of the Capital and, in particular, the responsibility for conservancy, control of nightsoil disposal and operation of the waterworks of Bangkok, under the supervision of the City Engineer—Adviser of the Department. In this connection it may be mentioned that the water supply of Bangkok is taken from the river above the City, precipitated, filtered and chlorinated. It is regularly examined bacteriologically and chemically, is consistently of a high standard, and has undoubtedly had a notable effect upon the health of the inhabitants.

The Medical Officer of Health of Bangkok, for the time being under the central health department as aforesaid, works in affiliation with the District Officers, the City Engineer and the Commissioner of Police. His division is in charge of sanitary inspection, vital statistics in the Registration Area, control of infectious diseases and the Infectious Diseases Hospital, the Central Hospital, the Health Centres of the Government and medical service of the prisons within the City.

The institution of Health Centres is one of the recent activities of the Department of Public Health; ten of these, to cover the

Registration Area of the City, have been planned, of which six are already functioning. Briefly they exercise general health and sanitary supervision over the districts, including the investigation of causes of death, the checking of birth registration and vaccination. There is an out-patient clinic at each of the centres and public health nurse-midwives are attached to the staff, special attention being given to maternal and infant welfare. The Bang-rak Health Centre is organized and recently rebuilt as an up-to-date clinic for the treatment and prophylaxis of venereal diseases. In a measure all these centres are devoted to health education and propaganda.

Another branch of the Ministry of the Interior, the duties of which have direct bearing upon the public health status of the Kingdom, is the Immigration Department. One of the functions of the Ministry under the provisions of the Immigration Law is the medical examination of all those who enter the country for the purpose of intercepting all active cases of lunacy, leprosy, tuberculosis, syphilis and trachoma. The question of entrusting to the Department of Public Health the general and technical supervision of the full-time Medical Officers who carry out this inspection at some of the seaports and other points of entry is under consideration with a view of improving the standard of the work of these highly responsible officials. All the part-time Immigration Medical Officers are regular members of the public health staff.

The staffs of the central divisions of the Department consist of 162 officials and employees of various grades.

The Hospital for Mental Diseases and the Vajira Hospital employ 112 officials and others of whom 8 are physicians.

The staff of the Medical Officers of Health of Bangkok consists of 195 officials and other employees and includes 31 medical officers.

The field staff of the Department, permanently posted in the interior, number 127 medical officers who are assigned as Circle Health Officers in the 14 Circles, as Provincial Health Officers in 45 of the 79 Provinces and as Local Medical Officers in 61 of the more important Districts. It also includes 173 other employees consisting of nurse-midwives, sanitary inspectors, clerks and other assistants.

Thus the roll of the Central Health Organization includes, besides the Director General, 191 health and medical officers, 5 engineers and architects and 566 other employees, making a total of 769. If to these are added the 15 full-time Immigration Medical Officers, the grand total is 784.

Indirectly under the general and directly under the technical supervision of the Department are 28 medical officers, 22 nurse-midwives and a number of local dispensary and hospital attendants, most of whom are employed by the Sanitary Boards.

Six officials hold public health degrees or certificates, all but one obtained through fellowships granted by the Rockefeller Foundation, and three of the engineers of the Department hold university degrees; these constitute a valuable nucleus which, it is hoped, may steadily increase. One hundred and twelve other medical men have had special training in the departmental course for health officers. One hundred and seventy sanitary inspectors have also taken the prescribed annual course organized by the Department. Under an existing scheme, three physicians and a statistician of the Department are receiving specialised training in America; while two departmental students are being trained abroad in engineering. By an amended scheme already submitted the Department hopes considerably to enlarge its present programme for the study in foreign countries of preventive and curative medicine as well as in sanitary or public health engineering, architecture, town-planning and other technical subjects connected with its duties.

The Health Council.

At the Conference of the League of Red Cross Societies held at Bangkok in 1922, the peace-time health programme of the Societies was formulated and a resolution was passed expressing the desirability of forming a national health council in each country for the purpose of bringing about co-operation among the different agencies interested in the advancement of public health. Notwithstanding the repeated efforts of the Siamese Red Cross Society towards this end and the active sympathy of the Department of Public Health, a formula could not be found for some time that would fulfil the aims of representation of real responsibilities on the one hand and of effectiveness on the other. At last

however a compromise was reached, and in April 1928 a Royal Decree was issued by virtue of which the National Health Council was instituted.

"The promotion and conservation of the health of the general population is an important duty of the Nation." So declares the Decree. "Public health work and sanitation, medical service, the prevention and suppression of epidemic and other dangerous diseases, health nursing and health education as well as other allied activities are all means by which the public health is promoted. Although several state organizations and other agencies exist to carry on such work, their efforts are as yet independent of one another. The co-ordination of their work, the division of their duties so as to avoid unnecessary duplication and the concentration of their resources when necessary occasions arise would bring about greater beneficial results."

The status of the National Health Council is that of a consultative and advisory body, and its resolutions, adopted at a general meeting, only become effective after the approval of the Minister in charge of public health. The members of the Council are appointed by the same Authority and, as at present constituted, they represent the Department of Public Health, the Army Medical Service, the Navy, the Ministry of Public Instruction, the Royal State Railways, the Siamese Red Cross Society, the International Health Division of the Rockefeller Foundation and the American Presbyterian Mission. As has been previously stated, the Director General of Public Health is *ex-officio* president of the Council and, as such, acts as its chairman at general meetings.

The duties of the Council, set forth in Section 5 of the Decree, consist of—

"(1) The co-ordination of the normal activities of the various state organizations and other agencies;

(2) The division of duties performed by the state organizations and other agencies so as to avoid wasteful or unjustifiable duplication;

(3) The preparation of schemes for preventing and suppressing epidemic diseases as well as for assigning duties to be co-operatively undertaken in the event of sudden outbreaks of epidemic diseases;

(4) The preparation of schemes for, and the division of duties in the work of preventing and combating certain dangerous diseases;

(5) The preparation of schemes for, and the division of duties in the work of relief on the occasions of public calamity resulting in injury or sickness, and

(6) The consideration and submission of opinion in respect of any matter appertaining to the public health as may be referred for advice by the Minister in charge of public health or the Director General of the Department of Public Health."

The Council possesses the power to call upon any person as a witness of fact or to give expert evidence; and due provision is made for its necessary expenses.

Since its inception the Council has held three sessions, and has deliberated upon such important questions as the desirability of the participation of Siam in the International Sanitary Convention of 1926, the site of the permanent quarantine station for the Port of Bangkok, the control of the preparation and distribution of biological products, the organisation of a leper colony in the Province of Bhuket as well as many other matters submitted by the Department of Public Health. It has recently approved of a comprehensive scheme for dealing with the important problem of tuberculosis submitted by the Siamese Red Cross Society, and has under contemplation a proposal for revising the law which controls the spread of venereal diseases. Short as may be the time since it has come into existence, the Health Council has proved its utility beyond any reasonable doubt.

The Economic and Financial Aspects of Public Health.

The aphorism that "health is a purchasable commodity" contains a far-reaching truth as much for the individual as for the community. Regarded as a productive process the laws of increasing or decreasing returns operate in public health work as in an ordinary industrial undertaking. Space does not, however, permit of a detailed review of all the economic principles involved in this by far *the most effective method of creating the national wealth*, depending as it does upon the quasi-rent of biological fertility and recuperative power of the human race. A more relevant question is how we should determine the public outlay on health that

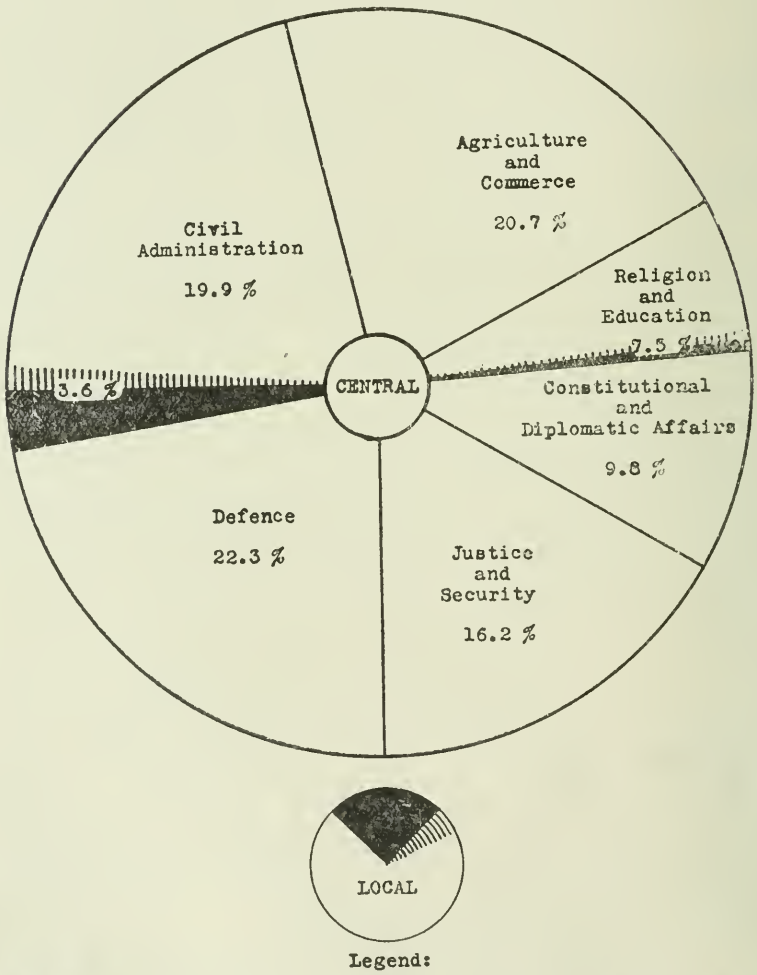
would be suitable to the need of the nation at this particular stage of its development. To consider first a broader issue, it is evident that the ratio of public expenditure, for the promotion of welfare and progress in civilisation of the community, to that for its protection against aggression and internal disturbance, is hardly capable of being simply determined by any economic or financial theory. It must also be decided by general expediency. But, at least as far as public health in Siam is concerned, there exists another criterion. Experience has amply proved that there is a fairly broad *margin of economical expenditure* which limits the minimum below which it is unwise to go, and the maximum above which public expenditure becomes undoubted extravagance. This margin is again determined by certain well-known and finite factors.

The one most worthy of attention among these to-day is the *personal factor* with regard to the small number of adequately trained men for either the public health or medical service; a factor which is relatively fixed in point of time. The factor of *knowledge* is practically unlimited as far as the supply of information contained in "the highly developed basic sciences of public health" and the accumulated experience of other nations are concerned; but here again it is considerably bound by the attitude of people, especially of the older generation, toward the application of the science of preventive medicine in actual life. Here again time and education, especially of the young, will undoubtedly enlarge this boundary. Education by itself will achieve much, but it must be supplemented by the judicious use of power. "Problems brought about by modern conditions, increased density of urban population, travel and commerce with the increasingly large interests liable to be affected by any change are multiplying more rapidly,"—in the opinion of Dr. Ira Ayer, the former Adviser of the Department of Public Health; and this cannot be dealt with in the absence of adequate *legislation*, which is the third and last factor of no less importance than the two above mentioned.

The appended circular diagrams of common scale showing the relative proportions of the estimated main items of expenditure of the Central Government and the total expenditure of the Sanitary Boards, which are therein designated as "Local," indicate

the relative positions of direct as well as indirect but obvious public expenditures on health and medical service.

DIAGRAMS OF PUBLIC EXPENDITURES
SHOWING THE SHARE ALLOTTED TO PUBLIC HEALTH
AND MEDICAL SERVICE



In even thousands the total estimate of the Department of Public Health for the present year, B. E. 2473, amounts to 1,476,000 baht (£129,150) of which less than fifty per cent. is assigned to salaries and the balance to general expenditures. This is equivalent to an annual expenditure of about 12.8 satang or just over 2½ pence per capita of the population. If to this is added 1,023,000 baht, being B. 20,760 estimated for the Medical Council, B. 280,000 Government contribution to the Red Cross Society, B. 722,240 for the Medical Services of the Army and Navy—but not including the expenditures of the Medical Faculty of the Chulalongkorn University and the School Health Division of the Ministry of Public Instruction, the appropriation for which being separately indicated in the sector representing Religion and Education—the total annual expenditures of the Central Government, *directly* appropriated for public health and medical service, amounts to about 2,499,500 baht or £ 218,700. In estimating the *indirect* health and medical expenditures of the Central Authority it is necessary to make due allowance for the work of the Police, Harbour Authority, the Municipal, Public Prosecution, Prisons and Immigration Departments as well as for the appertaining activities of the Local Authorities in so far as these are centrally financed. Likewise a due share of the Siamese contribution to the League of Nations should not be omitted in view of the part played by the Health Section of the League and its Eastern Bureau in international health matters. All this brings the estimated total amount, in round figures, to 850,000 baht, thus making a grand total of about 3,349,500 baht or £ 293,080 a year.

The twenty-six provincial Sanitary Boards, out of a total income of approximately 567,000 baht and a total expenditure of some 440,000 baht, apportion about one quarter of this amount to public health and medical service, say £ 10,000, or 4.23 per cent. of the central disbursement for the same purpose. This brings out in quantitative contrast the centralized condition of public health finance.

From these data it is possible to make a rough estimate of the total public expenditure on health and medical service which works out at a little more than 30 satang or just over 6 pence per capita of the present population.

This is of course a very small amount of money as compared with most countries and there is much need for increased appropriation for certain purposes. But in making comparisons it is well to remember the limiting factors already indicated.

Public Health and Medical Legislation.

Following the not altogether unusual course in countries where progressive changes are taking place, health legislation lags behind the requirements of the health authorities. This is due partly to a natural conservatism and possibly to some question as to the expediency of legislating beyond the understanding of the people. Concerning this the views of the Department of Public Health were expressed in an early report as follows:—"Health education and a law ought to work together. If the law is too far in advance of the education of the people it will be more or less ineffective. If the Government delays the promulgation of a law until the education of the people leads them to demand it, advance will be unduly delayed and the people will suffer accordingly." Of course, laws that cannot be enforced are worse than useless, but it is also true that honest attempts to enforce suitable laws have in themselves an educational value which might with advantage be more generally recognised. Until recently the population of Siam has been essentially rural, and people have not yet become accustomed to the idea that increased centres of population and social organization may require some additional restriction of individual freedom for the benefit of the whole.

As public health legislation is fundamental, the principal laws now in force are tabulated below. From the historical point of view the list is not altogether without interest.

Summary of More Important Public Health and Medical Laws.

Year	Short Title	Application	Brief Summary
R. S. 116 (1897)	Local Sanitation Enactment[1]	Bangkok	Sanitary improvement and amenity in the Capital. Appointment of Medical Officer of Health and Sanitary Engineer. Certain duties and powers with reference to conservancy, night-soil, nuisances and control of buildings (certain sanitary and building clauses deferred).

Summary of More Important Public Health and Medical Laws (ctd.).

Year	Short Title	Application	Brief Summary
R. S. 117 (1898)	Regulations and subsequent orders [1]	Bangkok	Removal of certain offensive trades and special nuisances.
R. S. 119 (1900)	Prevention of Cattle Diseases	do.	Medical inspection of cattle and certain sanitary measures. Dealing with cattle for slaughter and export, and quarantine or destruction of infected cattle. Inspection of meat. Specification of location of cow stables.
R. S. 124 (1905)	Plague Notification [2]	do.	Notification of plague, or suspected plague by householders or attendants. Institution of isolation of cases and contacts. Disinfection.
R. S. 127 (1908)	Provincial Sanitary Organization [1]	27 towns and other communities	Creation of Sanitary Boards. Maintenance of cleanliness, prevention and treatment of disease. Roads, etc. Births, deaths and other statistics. Administration and organization, powers and duties of Sanitary Boards and officials.
R. S. 127 (1908)	Regulation of Prostitution and Prevention of Venereal Diseases [3]	General	Mostly police regulation of prostitution. Provisions for medical inspection.
R. S. 127 (1908)	Penal Code	do.	Certain articles concerning specified nuisances and infected foods.
R. S. 128 (1909)	Registration [4] etc.	do.	Census. Registration of births and deaths.
B. E. 2456 (1914)	Smallpox Prevention [5]	First Bangkok, later general	Compulsory vaccination or revaccination when required by ministerial order.
B. E. 2456 (1914)	Infectious Diseases [6]	Interior Provinces	Specification of Plague, cholera, smallpox and cerebro-spinal meningitis as (epidemic) diseases. Disinfection, isolation, quarantine, evacuation with special provisions in case of plague and smallpox.

1. To be replaced by Municipal Law now in draft.
2. Similar notification decrees for cholera, smallpox and cerebro-spinal meningitis were issued in 1918, 1919 and 1923.
3. Revision or repeal now under consideration.
4. Revision applicable to Bangkok in 1917. Amendment now in draft.
5. Recently amended.
6. Revision applicable to the whole Kingdom now in draft.

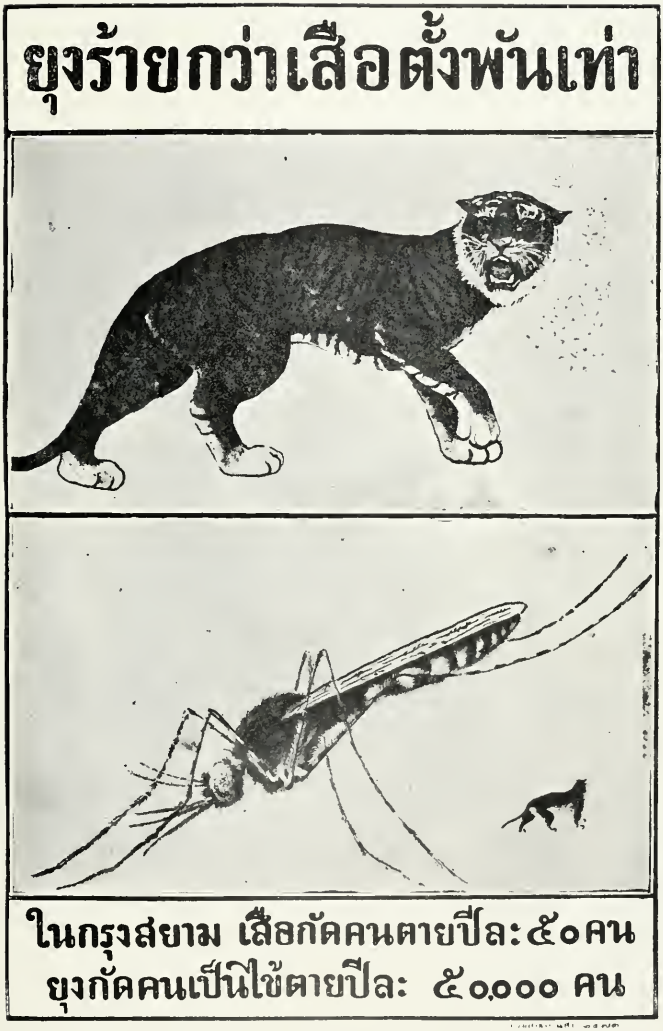
Summary of More Important Public Health and Medical Laws (ctd.).

Year	Short Title	Application	Brief Summary
B. E. 2456 (1914)	Navigation in Siamese Waters [7]	Bangkok	Includes provisions for maritime quarantine.
B. E. 2456 (1914)	Local Administration [8]	Interior Provinces and outer Districts of Metropolitan Area	General Local Administration, powers and duties of officials. Remedy or removal of dangerous structures. Commune "medicos." Considers in a general manner sanitation, public safety, etc.
B. E. 2465 (1922)	Harmful Habit Forming Drugs [9]	General	Control of narcotic drugs under Government monopoly and licensing of retail dealers and physicians.
B. E. 2466 (1923)	Medical Law [10]	Metropolitan Area (being extended to provinces)	Institution of Medical Council. Registration of practitioners of all classes. Regulations may provide for limited practice.
B. E. 2470 (1927)	Immigration Law	General	Regulation of immigration. Medical examination and interception of active cases of lunacy, leprosy, tuberculosis, venereal diseases and trachoma.
B .E. 2470 (1928)	Skimmed Milk [11]	do.	Prohibition of the importation and sale of skimmed milk.
B. E. 2471 (1928)	Health Council	do.	Institution of National Health Council-Constitution-Duties and powers to call witness.
B. E. 2472 (1929)	Medical Amendment	Metropolitan Area (being extended to provinces)	Institution of Medical Council. Registration of practitioners of all classes. Regulations for restricted practice.
B. E. 2472 (1929)	Smallpox Prevention Amendment	Metropolitan Area and 9 Circles	Regulation of vaccination certificates.

7. Revision now in draft.
8. do.
9. Amendment now in draft.
10. Amended.
11. Amendment under consideration.

Popular Health Education.

The first annual report of the Medical Department of the Ministry of the Interior for the year B. E. 2458 (1915-1916) contained an appendix in which a fairly complete programme of



A Public Health Poster.

Top — The Mosquito is a Thousand Times more deadly than the Tiger!

Bottom — In Siam, Tigers kill fifty persons a year, and Mosquitoes cause fifty thousand deaths annually.

popular health education was outlined. As a matter of "historical" interest, its gist may be given here in a few sentences.

After giving general reasons for this universally recognised activity of a health organization it went on to propose four different means of health education. These are (1) *the human means* which it considered by far the best, and emphasised the point with the epigram that the patient believes more in his physician than in what his physician believes. But as good teachers of grown up people are rare among the non-professional laity, it recommended (2) health teaching *by means of the schools.* It should be mentioned in digression here that the monasteries of Siam have been in the past and, at least as far as the interior is concerned, still are important sources of education, not excepting that respecting health and sanitation. The report in question instanced (3) various *mechanical means* employed in other countries such as picture posters, models, exhibitions and the cinematograph which were considered as especially suitable for the illiterate majority; and for those who can read it advocated the *means of literature*—hand-bills, pamphlets and books which should be simply written and liberally illustrated. It finally hinted that health education should not be confined only to the common people, but that those in authority should be tactfully included. It remains to add that all this was considered very radical *at the time.*

There is a far cry from those days, fifteen years ago, to the present, with an actual governmental Division of Health Education. The Department of Public Health has often asserted, in view of the circumstances existing in this country, "that instead of being one of the later activities of the health authority as has frequently been the case, health education should be one of the first." It may be said that the Department has lived up to this principle. There is evidence in the changing attitude of people of all classes that it is bearing fruit, and in this connection the work of the Red Cross Society and the International Health Division has deserved a full measure of praise.

The Division of Health Education now possesses 4 cinemato-

graphic projection outfits, photographic and cinematographic cameras, a number of stereopticons and "attract-o-scopes," over 1,000 lantern slides and a repertory of 60 films, 16 of which are permanently loaned from the Red Cross Society. An anti-cholera film entitled "What You Eat" and a lengthy melodrama concerning malaria called "The Mosquito is more deadly than the Tiger" are original productions organized by the division itself.

Both the Department of Public Health and the Red Cross Society have published a great amount of health literature and have been associated in public health exhibitions. The setting up of exhibits at all the important fairs and pilgrimages throughout the Kingdom has become a routine.

The Department has an editorial staff by means of which a monthly Public Health Bulletin is published. Starting six years ago with 500 copies of some 50 pages, it has increased to 1,700 copies of 150 pages owing to the increased demand. General reports of the Department are annually published in Siamese, and abridged editions in English are issued for the benefit of foreigners. There are in actual use 60 different pamphlets, 36 picture posters; and on occasions tens of thousands of handbills, cards and coupons are circulated. Competition prizes and even matches faced with a health suggestion such as "Get vaccinated against Cholera to-day," have been employed with good results.

Although not directly for popular use, there is a good working library of the Department containing over 2,000 volumes. It receives many of the important health and medical periodicals and is also on an exchange list with foreign health organizations. From this mine of information the Editorial Staff collects the materials for its work which of course includes local and topical matters.

In its pedagogics the Department always insists upon what may be called "The Three S's" of popular health education. These are *simplicity*, *specificity* and *suggestiveness*. It prefers to rely more upon the last than upon any argumentative reasoning which is difficult to adapt for the purpose of propaganda, being a method of imparting knowledge considered to be more suitable for general

education or the intelligentzia than for the man-in-the-street. It also bears in mind the essential order of effectiveness, namely first comes *quality*, second *economy* and third *quantity*.

The Population and Vital Statistics.

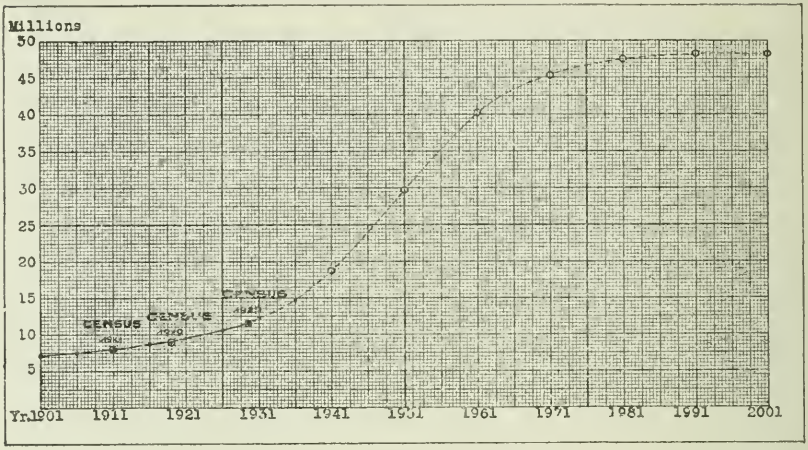
The last census of the Kingdom was taken in July of the year 1929, yielding a total population of 11,506,207 persons. The total rate of increase per annum for the last ten years worked out at 22.45 per thousand. According to the computation of the Department of Public Health based upon the figures of this and the preceding census the natural rate of increase, that is, excess of births over deaths, after making due allowance for immigration, is at the rate of 18.96 per thousand. The following table gives the relative rates of 23 countries :—

Order of Magnitude.	Countries	Based on	Rate per 1000	Authorities
1	Soviet Russia	1924-25	19.4	L'Annuaire Statistique, 1928.
2	*Siam*	1919-29	*18.96*	Statistical Year Book, 1928-29, and the reports of the Department of Public Health.
3	Argentine	1923-25	18.4	L'Annuaire Statistique, 1928.
4	Formosa	1922-24	18.1	do.
5	Egypt	1924-26	17.9	do.
6	Bulgaria	1923-25	17.7	do.
7	Netherlands	1924-26	14.6	do.
8	Roumania	1923-25	14.2	do.
9	Philippines	1923-25	13.4	do.
10	Japan	1923-25	13.1	do.
11	Portugal	1921-23	12.1	do.
12	Ceylon	1923-25	11.9	do.
13	Italy	1924-26	11.0	do.
14	Spain	1924-26	10.2	do.
15	United States	1923-25	10.1	do.
16	Denmark	1924-26	9.8	do.
17	Burma	1911-21	8.7	Burma Admin. Report, 1921-22.
18	Germany	1924-26	8.3	L'Annuaire Statistique, 1928.
19	British India	1923-25	7.9	do.
20	Belgium	1924-26	6.6	do.
21	Greece	1921-22	6.5	do.
22	England-Wales	1924-26	6.3	do.
23	France	1924-26	1.5	do.

It will be seen that the rate of natural increase of the Siamese population is second only to that of the Soviet Russia.

If the estimated population according to a table given in the

Statistical Year Book of the Kingdom of Siam B. E. 2471 (1928-29) which covers a period of 28 years, is plotted out, it will be seen, as in the following graph, that the plottings exactly fit the lower part of the tracing of the typical "logistic curve" which indicates an asymptote (a maximum of population) in the neighbourhood of 48,000,000 in about six or seven decades.



This is a much greater rate of growth than will result from the formula—$\log P_n - \log P_c = n \log 1 + r$ employed for an inter-census rate by geometrical progression and may be, of course, only an interesting speculation of a future *possibility* based upon the assumption of a continuity of the present "cycle of growth." The present density of the population is 301 per square kilometre in the Metropolitan Area, which is by far the most thickly populated, and only 14 per square kilometre in the least populated Circle of Chandaburi; while the average for the whole Kingdom is 22. A population of 48,000,000 would be equivalent to an average density of 93 per square kilometre, which is by no means an absurdity, provided always that an adequate increase of wealth will at the same time support the population in a condition approximating the optimum for the country. In this connection the Speech from the Throne with reference to the last census gave timely warning of the underlying danger of such a rapid growth without at least a parallel increase in the means of subsistence. His

Majesty the King therefore urged upon the nation the necessity of earnest application to the development of both commerce and industry. The causes contributing to this accelerated natural increase of the last decade also furnish another interesting matter for speculation to which the Royal Speech also alluded. Whatever they may be, the principal task of the Health Authority is clear, and that is, so to improve environmental conditions that the present and future population of this country, whatever its number, will thereby be so benefited "that the waste of living may fall to its least, and the wealth of living may increase to the uttermost."

* * *

In giving a short account of the vital statistics of the Kingdom it should be admitted in the first place that the accuracy of original returns, especially those from outside the Registration Area of Bangkok, are subject to question, and that they tend to affect the values of rates which are thus only calculated to the nearest integer.

Since 1926 the Department of Public Health has been made responsible for the general collation of statistics of births and deaths, hitherto handled by the Division of Registration of the Administration Department of the Ministry of the Interior.

Some typical statistical data are given in the following tables. The year of the Buddhist Era is from the 1st of April to the 31st of March.

Some Typical Population Statistics (Census of 1929).

Areas	Population	Males	Females	Density of population per sq. km.
Whole Kingdom	11,506,207	5,795,065	5,711,142	22
All Interior Circles	10,584,590	5,296,170	5,288,420	20
Metropolitan Area	921,617	498,895	422,722	30
Registration Area, Bangkok	489,488	275,530	213,958	5,152
Most populous Circle (Nagor Rajsima)	2,822,710	1,371,746	1,447,964	30
Least populous Circle (Chandaburi)	169,626	86,605	83,021	14

The largest Sanitary Area in the interior contains an estimated population of 16,870. The smallest contains 1,047.

The Population by nationality in the Registration Area of Bangkok, according to the last census, is as follows:—

Nationalities	Males	Females	Total
Siamese	131,570	135,681	267,251
Chinese	132,526	69,586	202,112
Europeans	743	502	1,245
Indians	9,819	7,630	17,449
Americans	35	39	74
Burmese	295	187	482
Japanese	132	81	213
Cambodians	389	231	620
Others	21	21	42
Total ..	275,530	213,958	489,488

Births and deaths reported in the whole Kingdom for the years 1921-1930.

Year ending March 31st	Births			Birth rate per 1000	Deaths			Death rate per 1000
	Males	Females	Total		Males	Females	Total	
1921	129,783	120,164	249,947	26	84,350	72,751	157,101	17
1922	133,744	124,348	258,092	27	83,697	70,928	154,625	16
1923	143,950	133,959	277,909	28	86,687	73,048	159,735	16
1924	152,563	141,387	293,950	29	85,628	73,106	158,734	16
1925	150,265	139,075	289,340	28	86,150	72,727	158,877	15
1926	163,204	150,162	313,366	30	83,678	68,994	152,672	14
1927	159,029	145,732	304,761	28	96,209	82,342	178,551	17
1928	171,031	156,907	327,938	30	85,788	70,952	156,740	14
1929	179,602	163,473	343,075	30	96,662	80,996	177,658	16
1930	187,544	171,628	359,172	31	99,981	85,440	185,421	16

Births and deaths in the Registration Area of Bangkok for the years 1927-1930.

Year ending March 31st	Births	Deaths	Birth rate per 1000	Death rate per 1000	Infant mortality (under 1 year)	Infant death rate per 1000 births
1927	13,407	14,464	27	29	3,517	262
1928	14,476	11,579	26	21	3,025	209
1929	17,096	12,523	29	22	3,421	200
1930	16,853	13,341	34	27	3,804	226

The infant death rate (per 1000 births) in the Registration Area of Bangkok, for the year ending March 31st, 1930, was 226. The average for ten years ending March 31st, 1930, was 234.

Deaths from violence and accidents for the whole Kingdom.

Year ending March 31st	Drowning	Venomous bites and stings	Wild animals including tigers and crocodiles	Domestic animals including elephants	Other causes	Total
1930	986	208	28	89	2,360	3,671
Average for 5 years (1926-1930)	827	143	38	81	1,749	2,837

A statistical résumé of complete hookworm control and sanitation work accomplished by the International Health Board in co-operation with the Royal Siamese Government from 1917 to 31st March 1929 (inclusive of 3 years under the immediate auspices of the Siamese Red Cross Society) are tabulated below :—

Treatments, first	
For intestinal parasites, in general ...	1,766,274
For hookworm disease	1,307,152
Stool analyzed for Intestinal Parasites	722,453
Positive for Hookworm	65.18%
Positive for Ascaris	24.07%
Positive for Trichuris	9.22%
Positive for Strongyloides	0.21%
Positive for Oxyuris	1.04%
Positive for Taenia	4.23%
Positive for Others	3.13%
Lectures given, number	35,843
Total estimated attendance	1,989,522
Estimated average attendance per lecture	56
Health Literature distributed, pieces ...	467,082
Inspections :	
New latrines	420,654
Old latrines	167,553

Communicable Diseases.

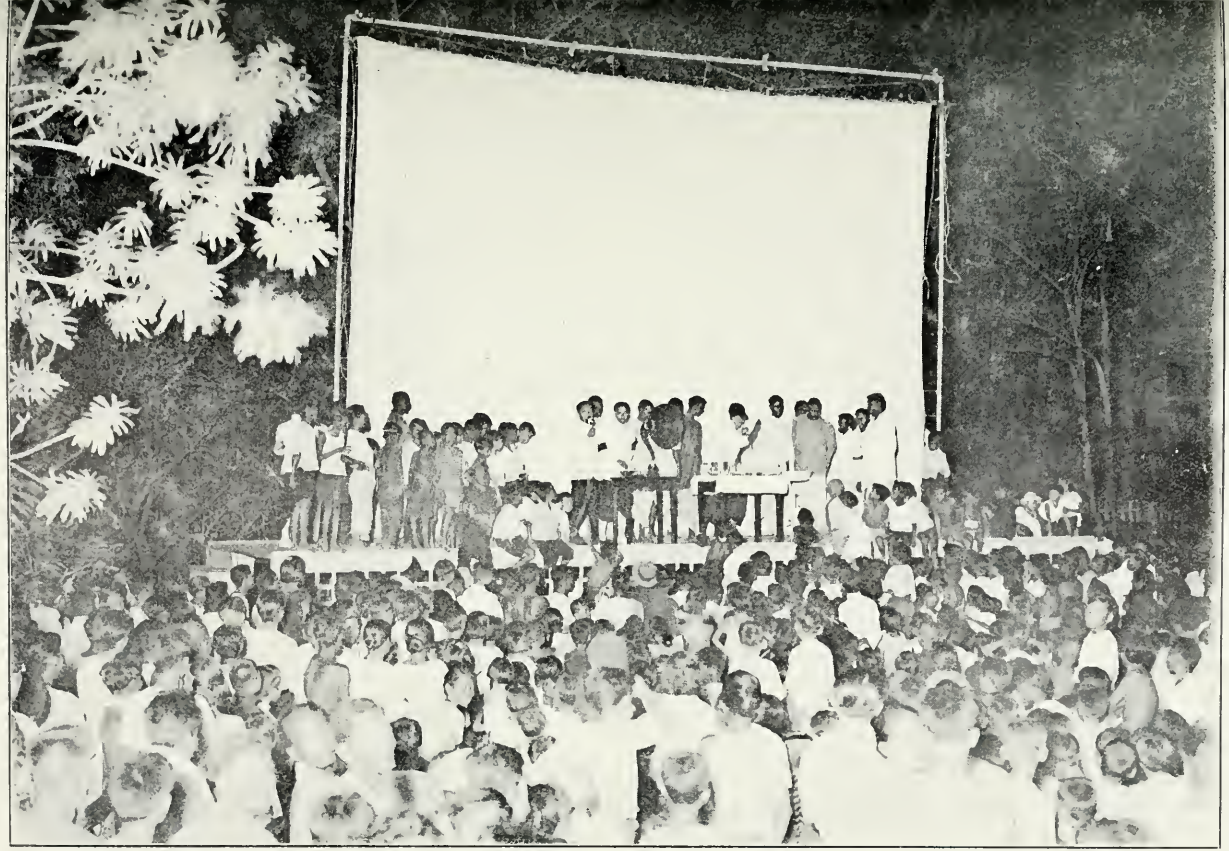
The following monograph on infectious and epidemic diseases, written by Dr. Ira Ayer, the former Adviser of the Department of Public Health, in 1926, is here given with only a few additional remarks and slight modifications:—

"The Department forwards epidemiological and pertinent information to the Health Organization of the League of Nations, of which Siam is a member, and exchanges similar information by telegraph and radio with the Eastern Bureau of the League at Singapore. The work of the Bureau at Singapore is regarded as of great value, not only intending to standardize returns so that they are more easily comparable and in distributing information of practical value, but in bringing the different administrations into closer touch with one another and fostering a spirit of co-operation which should be of far reaching effect.

"The notifiable epidemic diseases are plague, smallpox, cholera and epidemic cerebro-spinal meningitis. Telegraphic reports of all cases of these diseases are required to be made to the Ministry of the Interior.

"Epidemic cerebro-spinal meningitis is not very prevalent and has been confined chiefly to prisons and barracks. It was first recorded in Bangkok in the report of the Medical Officer of Health for the year 1921.

"The first case of plague appears to have been noted in Bangkok in 1904, about ten years after the beginning of the present pandemic which, starting from the interior of China, has gradually involved in some degree nearly every country in the East. The disease established itself in Bangkok and quickly spread to certain localities in the interior. Though by no means as serious as in certain other eastern countries it has become one of the endemic diseases of Siam. No documentary records are available for the earliest occurrences but some examples from unofficial sources of information may be of interest. The inland town of Korat, which was affected soon after plague was reported in Bangkok, was subject to almost yearly outbreaks; in 1906 a whole section of the town was burned in an attempt to eradicate the disease; in 1908 the number of daily cases is said to have reached a maximum of 35; in 1912, during a single dry season, over 800 people are said to have died.



Outdoor Public Health Cinema—anti-cholera inoculation being explained and demonstrated to crowd.

Departmental records for the interior provinces date from 1914. In the year 1917 during the course of a severe epidemic in which the population of this town of about 7,000 people was literally decimated, very thorough reconstructive work was carried out under the direct supervision of the Director of the Medical Department of the Ministry of the Interior; since then there have been only a few minor recurrences.

"An officer of the provincial gendarmerie, who was stationed at Korat, tells of the following interesting experience. One day he met a procession carrying a bier upon which lay a figure dressed like a corpse for burial. People beating drums headed the procession and others carrying lamps and torches flanked it on either side; it was followed by a huge crowd of excited people. The procession passed around the city walls and finally entered a temple, where offerings were made and the bier was left, the people believing that the plague spirits had been tricked into entering the figure and, this then being on holy ground, they could not get out to resume their evil work in the town. This is of interest as showing the attitude of some of the people not so many years ago, but now very different.

"A number of other places were early affected and show a somewhat similar history to that of Korat. In 1906 at Nagor Pathom over 300 persons are said to have died in a population of less than 3,000. The writer has seen instances where whole households have died within a few days. The death of two or three in a family of five or six has frequently occurred. Villages of over two thousand people have been deserted until the epizootic had killed most of the infected rats and the people could safely return. It says something for public health that such occurrences are now becoming infrequent.

"In the earlier outbreaks buildings or whole sections of infected towns were not infrequently burned. More recently, a large amount of alteration and reconstruction of buildings has been undertaken and, wherever this has been done, definite results in diminution or cessation of plague have been attained." Loans of money were sometimes made to small property owners to expedite such improvements. "Unfortunately, in the absence of powers to enforce building regulations, insanitary conditions gradually recur.

"The health authorities have been able to concentrate upon the rat as the chief factor in plague because epidemic pneumonic plague is rare in Siam and bubonic plague is seldom"—if ever in this country—"directly spread by the sick individual. There is a seasonal tendency in plague, usually the months of January to March or April.

"Severe epidemics of cholera occurred long before departmental records were kept. The older residents will tell of regular processions of coffins in what is now the principal business street of Bangkok. These belong to a past generation, but still cholera is one of the most serious of the epidemic diseases with which the health authority has to deal.

"The first general cholera epidemic of which official records are available, began in February 1919 in a small town on the upper course of the River Ping near the Burmese frontier. Notwithstanding all that could be done the disease spread rapidly and during the next two years there occurred over 18,000 cases and 13,000 deaths. Although sporadic cholera is reported every year from different localities, there is a tendency to a periodicity of about six years in these extensive outbreaks.

"An epidemic began in Bangkok in October 1925 and again extended rapidly. By the end of September 1925, over 10,000 cases and 7,000 deaths had been reported in the interior provinces, and 3,000 cases and 1,800 deaths in Bangkok. Very active educational propaganda was carried on, posters were placed prominently throughout the city and in the provinces, information concerning precautions to be taken was disseminated by means of public lectures and in the cinema halls, many thousand leaflets were distributed. The effect of this propaganda was visible in the actions of a considerable number of the population.

"During a period of two months at the height of the epidemic and before the onset of the rains, the Department of Public Health distributed over 1,000,000 gallons of water at the rate of about 17,500 gallons per day to communities in the vicinity of Bangkok, which had not access to the city water supply. Medicine was freely distributed and 237,206 anti-cholera inoculations were performed.

"The Siamese Red Cross Society greatly assisted in this emer-

gency by making the strenuous effort needed to prepare at the Queen Saovabha Memorial Institute the exceptional quantity of vaccines required, and further showed its desire to be of the highest service by supplying these to the health authorities free of charge during the whole period of the epidemic.

"The Navy also gave valuable assistance by converting the naval hospital at Bangkok into an emergency cholera hospital, furnishing the full staff, equipment and medical supplies.

"One of the Royal Princes generously lent his former palace to the Department of Public Health for use as an emergency cholera hospital. By reason of location and arrangement this became the best emergency hospital established by the Department. Private firms and citizens also gave material assistance by lending motor cars and a large water boat to the Department.

"It is of interest to note that in these epidemics the disease has tended to be more serious and persistent in the great central valley and along the course of the larger rivers, and relatively much less severe in certain Circles where the people depend for their domestic water supplies upon deep wells. In both the last and preceding epidemics Bangkok had the advantage of the present water system which undoubtedly did much to lessen the severity of the disease in the city.

"Since then two smaller outbreaks of cholera have taken place, the only noteworthy feature of these being the extensive use of anti-cholera vaccination which had become popular in most parts of the infected area and which undoubtedly checked their virulence even before the occurrence of heavy rainfall which has been often observed to have a very marked effect upon this disease.

"Smallpox is a definitely preventable disease but only at the price of continued watchfulness. Several years ago smallpox broke out in a small isolated southern fishing community. For various reasons, the outbreak got out of hand before the Ministry was informed of the true conditions and the disease spread to other places on the coast. The central health department then took charge and the epidemic was promptly checked, but the conditions in the localities first affected were evidence that, left to itself, smallpox could still disorganize the life of communities

in this country. Their activities were practically suspended, people marked by the disease were seen everywhere and, though the epidemic was beginning to burn itself out, persons in the active stages of the disease were widely scattered in the villages. In the face of this disaster there was a pitiful feeling of helplessness among these people until they appreciated the assistance which the health authorities were able to give them.

"On the whole the Government may properly feel some gratification regarding this disease as not only is the population becoming fairly well protected by continued vaccination but by intensive vaccination in the event of an outbreak a number of threatening epidemics have been brought under control.

"The 'conscientious objector' is fortunately not prevalent in this country."

The first of the following tables gives the records of free vaccination made by the staff of the Department and special vaccinators who are renumerated at a varying rate up to a maximum of 10 satangs per vaccination. The second table represents vaccination in the Registration Area of Bangkok.

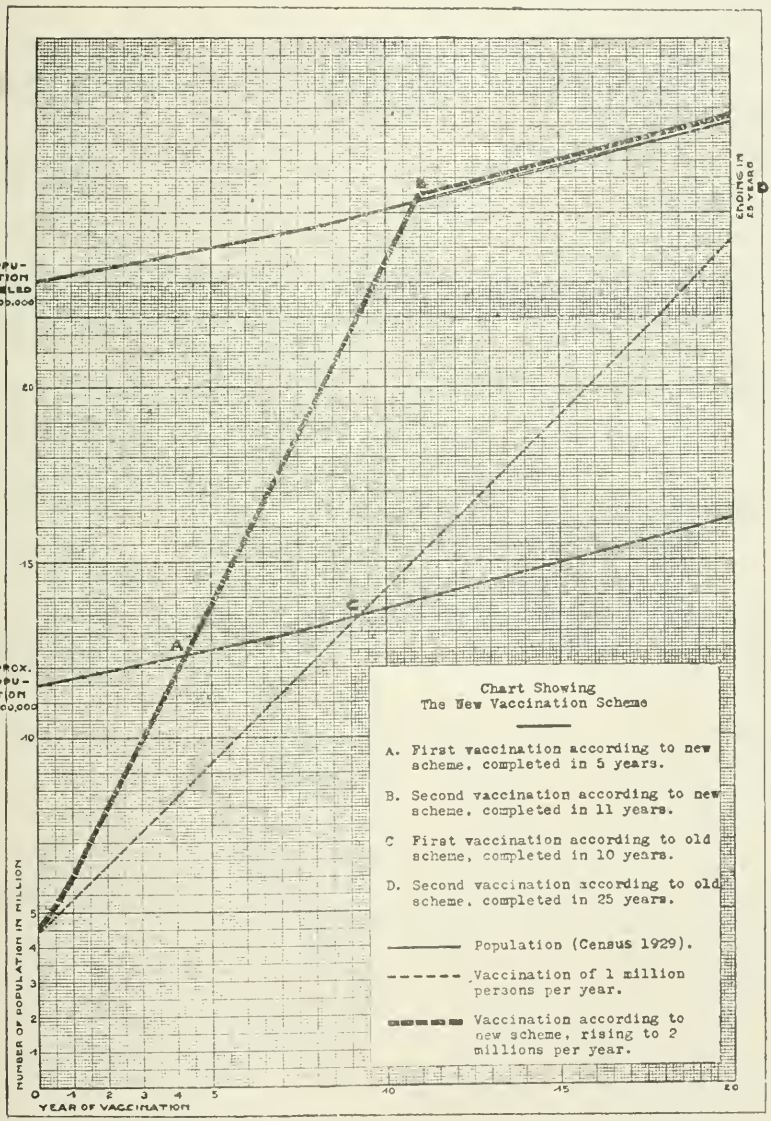
Interior Provinces.

Year ending March 31st	Number vaccinated	Per cent Successful
1918	514,198	92
1919	225,765	92
1920	192,490	83
1921	264,456	89
1922	460,195	92
1923	539,781	87
1924	992,662	83
1925	757,639	77
1926	1,047,740	79
1927	1,086,337	67
1928	1,076,235	71
1929	1,029,991	63
1930	1,617,249	69

Registration Area of Bangkok.

Year ending March 31st	Number vaccinated	Per cent Successful
1927	28,222	42
1928	22,880	53
1929	18,179	59
1930	37,461	46

The Department of Public Health is now organizing vaccination against smallpox under an eleven-year scheme, which aims at an annual increase of the number of vaccinations up to the maximum of 2,000,000 which it intends to maintain for a number of years. The appended chart which illustrates the scheme is self-explanatory.


POPULATION DOUBLED 23,000,000
APPROX. POPULATION 11,500,000
NUMBER OF POPULATION IN MILLION
YEAR OF VACCINATION
ENDING IN 25 YEARS
A
B
C
D
Chart Showing
The New Vaccination Scheme
A. First vaccination according to new scheme, completed in 5 years.
B. Second vaccination according to new scheme, completed in 11 years.
C First vaccination according to old scheme, completed in 10 years.
D. Second vaccination according to old scheme, completed in 25 years.
Population (Census 1929).
Vaccination of 1 million persons per year.
Vaccination according to new scheme, rising to 2 millions per year.

"Siam did not escape the great pandemic of influenza. It appeared in Bangkok in the month of October 1919 and spread from point to point over the whole country. The type was somewhat less severe than in many other places but over 80,000 deaths were reported as due to influenza during the six months of prevalence, in many places business was at a stand-still and even the government offices were closed.

"Year in and year out malaria justifies its characterization by Osler as the greatest single destroyer of the human race. When one has once seen a fever stricken village with more than half the population sick, with perhaps a death in nearly every household, it makes an impression not easily forgotten. Between 40,000 and 50,000 deaths from malaria have been reported in a single year. The question of dealing with malaria is of course constantly before the health authorities; quinine is distributed in increasing quantity but, owing to its extent and complexity, the malarial problem of Siam is yet far from practical solution." It is a worthy matter of note that the Speech from the Throne, already referred to, made special comments upon this serious national problem, and indications are not wanting that immediate steps will be taken to study the specific local factors.

"Dysentery is prevalent throughout the country. The amoebic form is a frequent cause of disability among foreigners, and it is likely that eating uncooked salads and garnished foods is one of the chief causes of this. During the epidemic of cholera such foods were not served in any of the hotels of the Royal State Railways, an example which is believed to be worthy of imitation.

"Hookworm and intestinal parasites are prevalent and widely spread. Owing to the activities of the Sanitary Campaign data concerning these diseases are more complete than for any others except the four notifiable epidemic diseases. Of variable intensity in different parts of the country, they are generally a good index of sanitary conditions and because of the facility with which they can be demonstrated and cured are largely utilized in connection with educational propaganda for improvement of the public health."

Pneumonia as well as some of the characteristic tropical diseases also require consideration. "Other diseases are," however, "notable for their absence or comparative rarity. Among these may be mentioned typhus fever, the relapsing fevers, certain diseases caused by flukes such as schistosomiasis, kala azar, human trypanosomiasis (African sleeping sickness), Malta fever, pellagra, diphtheria, scarlet fever and others. Yellow fever has fortunately never been brought into the Far East. Apparently one has to thank distance for this and there has been some apprehension on the part of eastern health authorities that with greatly increased facilities of communication the disease might be introduced. The extent of such a disaster in eastern conditions and a virgin field can only be guessed. But the Rockefeller Foundation, in its successful attempt to control yellow fever in its American strongholds and its undertaking to do a similar service for the west coast of Africa is performing a world service which will probably prevent such possibilities from becoming realities." A recent resolution of the Advisory Council of the Eastern Bureau of the League of Nations advising control of experiments with the virus of yellow fever in the East, is receiving the earnest attention of the Siamese Health Authorities.

The tables on the next two pages furnish data concerning notifiable diseases respectively for the whole Kingdom and for the Registration Area of Bangkok.

The Health Officials' Badge.

EPIDEMIC DISEASES

Notified in the Kingdom of Siam during the year ending 31st March 1930 and the 9 preceding years.

Diseases		1921	1922	1923	1924	1925	1926	1927	1928	1929	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Total
Plague	C.	195	191	322	211	288	235	42	119	121	12	8	2	4	5	5	33	1	8	13	16	16	93
	D.	150	150	261	178	213	176	33	89	104	10	4	1	3	5	4	3	1	6	9	11	11	74
Cholera	C.	3926	147	135	225	91	6229	8929	1795	2230	637	716	661	287	49	21	2	3	9	9	7	7	2408
	D.	2550	55	73	111	61	4235	6241	1280	1566	442	178	409	191	35	14	..	1	3	..	4	3	1580
Small-pox	C.	89	337	367	1636	383	579	867	368	98	40	37	91	66	29	24	19	2	71	2	..	3	387
	D.	27	90	84	705	142	190	319	83	14	6	11	13	11	9	11	3	1	11	6	..	..	88
Cerebro-spinal men-ingitis	C.	..	..	3	41	26	26	15	..	..	..	..	..	..	..	..	..	..	..	..	..	1	1
	D.	..	..	2	15	13	21	10	..	..	..	..	..	..	..	..	..	..	..	..	..	1	1

EPIDEMIC DISEASES

Notified in the Registration Area of Bangkok, during the year ending 31st March 1930 and the 3 preceding years.

Diseases		1927	1928	1929	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Total
Plague	C.	11	9	7	—	1	—	1	3	1	—	—	1	—	—	5	12
	D.	10	8	6	—	1	—	1	3	1	—	—	1	—	—	5	12
Cholera	C.	2297	364	356	94	159	30	7	10	9	1	2	6	9	2	1	330
	D.	1229	220	199	66	89	13	1	4	3	—	—	2	—	—	—	178
Smallpox	C.	267	29	2	—	1	—	5	1	—	—	—	1	—	—	—	8
	D.	163	15	—	—	—	—	—	—	—	—	—	1	—	—	—	1
C. S. Meningitis	C.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	D.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Other Social-Hygienic Problems.

The former Adviser of the Department had the following remarks to make concerning the question of infant and maternal welfare: "Though the infant death rate is not as high as in some of the more densely populated eastern countries, it is estimated that approximately one third of the babies die during their first year. This is considerably more than three times the infant mortality rate of the more advanced western nations and is not only an enormous waste of human life but a true economic loss to a country which is far from having reached its optimum population. The best information available also shows a high maternal mortality. But...*advance must necessarily be gradual.*" The reason for these italics will presently appear. "The health authorities are further hampered by the difficulty of obtaining accurate statistical information,"—as the obvious gap between the rate of natural increase and the differences between the rates of reported births and deaths, tabulated under a previous heading, fully confirms—"nevertheless the experience gained...is on the whole encouraging and some measurable progress is recorded. In any case the *potential value* of such work can hardly be over-estimated." This is all perfectly true, but there is yet more to be said. It is a well known fact among health authorities and especially those who are pioneer workers in a relatively new field, such as the eminent authority, Sir George Newman, that the first stage in the reduction of infant mortality from such high rates the Adviser had in mind, to a more moderate one, of say fifteen per cent., is a relatively simple task as compared with such efforts as are being directed in Western Europe against the odds of decreasing returns when the percentage is approaching the first digit. Is it not then the bounden duty of the health authorities to mobilise all available forces, even at the risk of abandoning other actions and pit the entire strength for this easy victory? Such indeed was almost the opinion of the writer until he was asked a very simple question by *another* eminent authority who should in this case remain unnamed. It was—"Are you sure your people have enough to support twice as many children?"

Natural affection may move a mountain but it cannot change the law of cause and effect. "Advance in this direction" then, "must necessarily be gradual" and *circumspect*.

The allied problem of maternal mortality, however, deserves undivided and whole-hearted attention. In this connection, reference should be made to the existing arrangement at the Vajira Hospital for the training of uncertified midwives by taking them into residence for a course of a few months duration, and giving them practical instruction which will enable them to conduct normal cases safely after they have returned to their homes and occupation. The first course is being started, and should the result prove satisfactory, similar training courses will be organized in the provincial hospitals having a maternity service. This should be considered as in the nature of an experiment, and if the outcome justifies expectation, the serious problems of disease and suffering inflicted upon Siamese motherhood through the ignorance of the majority of self-appointed midwives will be on the way to practical solution, pending a sufficient supply of fully qualified nurse-midwives in the probably distant future. The Red Cross Society and other agencies are also at work in this unquestionably most worthy cause.

His Royal Highness the late Prince Mahidol, C. P. H., M. D. *cum laude* (Harvard), was keenly interested in the problem of tuberculosis in Siam as he was in other social-hygienic as well as educational problems of the country, and contributed the first important pamphlet for popular use, now one of the departmental series, as early as 1919—the reader will have noted that the public health movement in Siam is only adolescent. While the writer was preparing to attend the International Conference on Tuberculosis at Rome in September 1928, the Prince wrote him a letter containing the following characteristic suggestion:—"When you are in England it might be interesting if you could meet Dr. Varrier-Jones who is in charge of the Tb. Colony at Cambridge. Dr. V.-J. came out with the statement the other day that sanatorium treatment is not as valuable as was thought on account of the poor sanitary environment to which the average patient has

to return on recovery or improvement." The writer went saw, and was impressed with this promising experiment. To the observing "layman" at least, the usual impressive hospitals, sanatoria and even the so-called "preventoria" are one and all "medical service in practice," not to mention the latest "pneumo-thorax" technique. This should not be taken as a sweeping disregard of the actual value of "hospitalization" in lessening the nuclei of infection—nor of the potential value of the B. C. G. of Calmette, but one should pause to contemplate the financial burden on the health budget that Siam can at present afford for the cost of housing, feeding with extra-nutritious food and attending expertly upon a number of urban and rural patients equal to, say, 5% of all the fatal cases of sickness in the Kingdom, to give but a conservative estimate. Only this relief to the cases that end in death would amount to something like half the entire central and local public expenditure on health and medical services of the nation. To allow for a marginal number of cases that would materially aid prevention, this again should at least be multiplied by five.

The almost analogous problem of leprosy is alike incapable of complete solution here by such a tactic of direct offensive. In passing, this may be said to be true not only of all social-hygienic questions but, with only a few fortunate exceptions, of all the social problems and even of crime itself, universally the most chronic of social ailments. The total annual cost of a frontal attack on leprosy by enforced—not to mention the more economical and therefore practical scheme of voluntary—segregation, will also amount to a trifle more or less than the present total public cost of health, depending upon the self-supporting economy of the institutions, or even, as was hinted at the beginning, of the properly instituted colonies. The leprosy financial ratio of approximately 1:3 of the Philippines public health estimate, considerably larger than that of Siam, is evidence of this high cost. The difference between these alternative schemes lies in the spontaneity of the colony plan as proved by the existing self-segregated leper villages of the North and eastern provinces. In discussing

the leper census, Dr. Ira Ayer wrote in 1926, "There are 10,000 to 20,000 cases in Siam.....Methods of dealing with this disease are under careful consideration, but the problem presented is one of extreme difficulty. There can be no question of prompt eradication and it will have to be dealt with step by step as further experience and resources become available."

What has been above written of tuberculosis and leprosy also holds good for the problem of venereal diseases, at least in so far as its sociological and administrative sides are concerned. Here however, in modern mathematical expression, the space-time attribute is almost vertical for the individual case, and steeply oblique for the community, especially when it is handicapped by *regulation*. The alternative of *abolition* is being considered here as well as by our neighbours, and in both cases are somewhat complicated by the local condition of urban sex inequality among the foreign inhabitants. If a forecast is justifiable, the result for Siam in the immediate future will be a compromise, for it is often impracticable to legislate against popular prejudice and conservatism—particularly perhaps, in the last category, when it carries the bâton of perambulating office, a phenomenon well known to all health reformers.

This naturally leads to those of the social-hygienic problems in which the hygienist comes out in his true quality as one who is entrusted with a share of the *police function of the state*. This is already seen in the obvious instance of immigration; it is more apparent still in the problem of mental diseases, which imperceptibly merges into that of the non-economic manifestations of crime. It is here that Siam owes a great debt of gratitude to the penetrating wisdom of her Royal Statesmen in entrusting to one Minister only the control of both the important Departments of Health and Police, often separated in governmental mechanism.

In dealing with both incurable crime and lunacy, *colonization* again offers a hopeful issue. Experimental work is already started for the former, while a further development of industrial therapy, recently begun, will undoubtedly see the latter on the way to realisation. This, combined with central psychiatric

institutes and out-patient clinics in all the general hospitals and health centres should materially help to solve this problem.

Enough has been discussed under this heading to indicate the complex ramifications of the present and future health problems of Siam, showing the gradual broadening of public health into public welfare. But a few words of justification will not be out of place. The health authorities are often criticised, usually by implication, amounting to the "constructive" advice that they should do "something about everything" with their present limited resources, whereas a little reflection will assuredly convince the critics that it is infinitely less wasteful and more expedient to confine our activities only to doing everything about some things. The criterion of relative value is the only possible one. Not to see the wood for the trees would be a serious mistake under existing Siamese conditions, and we literally cannot afford to temporise nor to make expensive mistakes in order to augment our experience. To borrow a Shavian phraseology, it is only "our capacity for experience" that should be critically called into question.

The Problem of Medical Service.

The Managing Vice-President of the Siamese Red Cross Society, in a contribution to Volume I, No. 9 of the "Red Cross", gave a most suggestive bird's-eye view of the medical personnel of Siam. The article began with a brief reference to a reported lecture given by Dr. W. W. Peter, member of a health educational association in China in 1923. According to the statement of Dr. Peter, Siam then stood in need of some 5,000 scientifically trained physicians whereas the number of the fully qualified was estimated at about 100. Dr. Peter believed there were about 500 persons trained up to the standard of the government curriculum at the time, and approximately 10,000 untrained actual practitioners. Basing his conclusion partly upon the contemporary statistics of *progressive* countries, the Vice-President gave as his general opinion that a ratio of *one general practitioner to 2,500 heads of the population would be ample for Siam.* In view of existing conditions, this seems at first sight a bold assertion. With the

estimated population of 1923 at 10,041,000 the ratio would work out at a trifle more than 4,000 general medical practitioners then required for the whole country, or at roughly 4,700 with the population of to-day which verges upon 12 millions.

Now, after a lapse of seven years, and with the advantage of additional data derived from the registers of the Medical Council it is possible to be more explicit in making quantitative statements. The medical registers for the Metropolitan Area—those for the rest of the Kingdom not being yet available—reveal a total of 1,850 persons actually carrying on *general* practice. The ratio of practitioners to the present estimated population of 950,000 thus works out at 1 to 517, a conservative ratio as will subsequently be seen. The application of this to the estimated present population of the rest of the Kingdom, say 11,000,000, would yield, all things being equal, a quotient of over 21,000, thus making an estimated total of over 23,000 general practitioners of curative medicine for the whole Kingdom, that is to say, a number well over *twice* that estimated by Dr. Peter and nearly *five times* that estimated at the rate suggested by the Vice-President of the Red Cross Society. This assumption of similarity of conditions between the metropolis and the interior is, of course, improbable. But the case, nevertheless, stands.

Why then did Dr. Peter declare in 1923 that Siam then required 5,000 qualified physicians? Or, much more interesting still, what were the assumptions of the Chief Executive of the Red Cross Society when he boldly put forth the ratio of 1 to 2,500 which is tantamount to advocating an absolute number of well under 5,000 as being the total number of qualified physicians and surgeons required for the whole country to-day? To answer these questions, it is necessary to look more closely into existing facts. In the meantime the last figures should be well borne in mind by the reader.

Since the foundation of the Medical School, a total of 563 certificates and 34 degrees (an annual average of 17 for the latter) have been conferred, making a total of 597. Allowing for natural casualty and superannuation in the course of forty-one

years, the total number of medical graduates in actual employment or practice will probably not be greatly in excess of 500. Of this number 280 (or 56%) are in the employment of the civil administrative services of the Central and Local Authorities, and 131 (say 26%) are employed by the Defensive Forces, making a total of 411, or about 82% of all the available medical graduates. It should be noted that this makes no allowance for the organized medical services of the Red Cross Society, which employ 32 or 6%, and possibly other organized agencies. If all known graduates were included to form a total of 443 physicians and surgeons employed by all the *organized* services of the Kingdom, the percentage of those in private practice to-day (not counting foreign graduates) will be reduced to something *less than 2 per cent.* It will thus be seen that the difference between the actual number of medical graduates and the total estimated requirement of Siam is approximately 4,500 or 90%, which represents the starting point of a rapidly growing number to be made up in a reasonably near future, as *every decade of delay will involve a cumulative loss to the health and especially the economic welfare of the Kingdom.* In this lies the national problem of medical service.

A short reference here to medical education both at home and abroad, the main sources of supply of the scientific medical personnel of Siam, may perhaps be useful in this short treatise on national medical service. The present capacity of the Medical Faculty will probably produce an average annual number of, say, 17 graduates or less. In view of this small number, there is a strong presumption that, after reckoning current expenses and over-head charges which should include interest on invested capital, depreciation, etc., the "cost of production" per successful student is far too high. The alternative of medical education in foreign countries, apart from its probable enhanced quality, is a matter to be constantly borne in mind. But, of course, there are *other considerations* apart from economy. The criterion of relative value undoubtedly received the full attention of the reformers of the Medical School when they decided upon this seemingly heavy sacrifice of the present medical service of the nation, not to

mention the other health services. There however remain four improvements of practical and immediate interest from the points of view of national health as well as national economy. These are as follows:—

1. An adequate "capital expenditure" in medical education, if necessary by means of a loan, in order to attain, as soon as possible, the *minimum of "economical expenditure"*.

2. The revival of *medical certificates* or diplomas (comparable, say, to the English M. R. C. S., L. R. C. P.) for the "by-products" of the best attainable medical education, in order more adequately to provide for *the only satisfactory method* of raising the standard of medical service in the Kingdom.

3. A *parallel*, and *adequate* public provision for the employment of *all* future medical graduates, with the prevailing salaries at least *doubled*, as it is a significant fact of the present relative *unattractiveness of medicine as a career* in this country that the current first year course of the Faculty only contains 12 students.

4. The re-organization of the medical educational scheme in order to include almost as much of an alternative course in preventive medicine as is contained in the $6\frac{1}{2}$–7 years curriculum, for a good instance, of the Medical Faculty of Oslo University,* as almost *one third of all graduates are employed by the public health services.*

The reasons for these hypotheses will be gathered, it is hoped, from the rest of this and the following headings. In the meantime it suffices to state that a much more strenuous advocate of the second of these reforms is to be found in Morden Carthew, M. D., D. P. H., one of the former Advisers of the Department of Public Health, and for many years on the staff of the Metropolitan Health Organization of this country.

* * *

In the same monograph on which the present subject is based, the Vice-President of the Red Cross Society also guides his readers to an astute and realistic glimpse into the mysteries of the

*Ref. Report on Norway by Dr. Th. Madsen, League of Nations.

respectable practitioners of the ancient and dogmatic art of healing as well as of the disreputable merchants of more shady practice. As such persons supply more than nine-tenths of the present medical need of the nation, it will be worth while to give a short description of their activities. The authority, referred to, suggested eleven categories for their classification which in itself is a revelation. These are:—

(1) The Apprenticed Healers who follow the dogmatic traditions of the past and very often are highly respected, experienced and useful men;

(2) The Healers with Prescriptions who possess one or more specific recipes of repute, handed down from generation to generation or from preceptors to pupils;

(3) The Boil and Wound Healers, the former generally using ointments and forming a class that is rapidly disappearing through the encroachment of modern methods of minor surgery, while the latter were originally the dressers of foreign surgeons, before the advent of modern antiseptics, who confine their work to a crude form of surgical practice;

(4) Practitioners of Massage, a highly skilled class who do considerably more good than harm;

(5) The Unqualified Midwives who decidedly do much more harm than good;

(6) The Male Nurses who were previous members of hospital or other organized medical staffs and are useful as long as they confine themselves to their proper capacity;

(7) The Healers by Exorcism who employ water or magic spells and are somewhat analogous to the Christian Scientists, or at best to those who practise auto-suggestion;

(8) The Vendors of Drugs, including those who sell simples, as well as modern remedies and patent medicines—another national health problem, by the way, "economically resulting from the meeting of the older order with the new" (idem)—and, like their prototypes in all lands, have a weakness for untruthful advertising and for advising their customers;

(9) The Healers' Apprentices and Entourage who naturally

dabble in the "craft" of the household;

(10) The Healers by mere Wit or Conjecture who are "quacks" properly speaking, and finally—

(11) The rest of the Imposters who just manage to escape the criminal courts and the gaols.

The prevailing nationalities of these, apart from the Siamese majority, are Chinese, Burmese, Hindu and occasionally European. Their number is greatly in excess of the demand owing to the rising standard of living and the necessity for some form of livelihood. Any drastic suppression of all these unscientific practitioners will be out of the question until the medical personnel of the Kingdom has reached a few thousands. "In how long?" one wonders.

* * *

In conclusion of this necessarily curtailed account of medical service in this country, it is well to recall the remarks of Sir George Newman in the letter previously quoted. The phrase he used was "*to dovetail medical services in the whole system of government...*". These pregnant words from one of the most expert health admininistrators as well as the recent remarkable resolution of the British Medical Association actually advocating state medical service, are signs of the time. They indicate what appears to be the logical and inevitable trend of medical service, not only in England but all over the world. May not one then enquire whether this is not indeed the beginning of the end of *laisser faire* in medical matters? The query is of course a relative one, for with the possible exception of Abyssinia, there seems to exist no country to-day in which public control in some form or other is not exercised over medical practice. This will however form the subject of our next heading.

Over four years ago Dr. Ira Ayer drew the following conclusion from the premises of the existing *facts*:—"The large proportion of government physicians in the interior provinces is significant. As they are required to give medical service to the general population, there is already a real government medical service and *it seems more than possible that conditions in this*

country may lead to a state medical service from the beginning while not a few western nations are gradually feeling their way toward building a similar system upon the long established traditions of private practice. This would appear to be the *best present solution* of the problem of medical service in the interior of Siam..." Thus the ever conciliatory Adviser. It however remains to be seen—not perhaps within our lifetime—whether a country that has once adopted *organized medical service* as a social doctrine will afterwards recant and go back to the so-called "liberty" of private practice. In the light of this conception of a nation-wide organization—of embryonic "Mayo Clinics"—the *ratio of 1 : 2,500,* above quoted, will be seen to be *quite ample.*

Addressing a Rotary gathering some years ago, the present writer said: "We (public health workers in Siam) have one great advantage over our colleagues in some of the most enlightened and progressive nations of to-day. For public health work is relatively new here and being small and agile, we are able, through their generosity, and by their very kind assistance, to step on their broad shoulders. From this elevation we are able to look on their great achievements, *not as models* perhaps, but certainly as most valuable *guides* in our undertaking." The application of what was then said to the case in point is obvious, with the exception that for this context the words "*useful signposts*" should rather be substituted for "valuable guides." To the "practical" objectors, and their number will likely be nearly identical with the existing small minority of *bona fide* private practitioners of medicine, both scientific and empirical—the dissenting voice of the pseudo-scientific quacks and charlatans being disregarded—one might answer with the pertinent catechism of Anatole France, "Avant d'embrasser votre religion, avez-vous exigé qu'on vous montrât la carte de Paradis?"

The Medical Council.

This is a body which, in popular notion, is often confused with the Health Council. The only common features between them are that they are both under the jurisdiction of the Minister of the Interior, that they deal with medical or quasi-medical

matters and that a few official members serve on both. Perhaps the *ex-officio* presidency vested in the same individual also helps to make the confusion more confounded. But in constitution and function, a greater contrast can hardly be imagined. The Health Council is deliberative and advisory, while the Medical Council is executive, regulative and almost magisterial, as will subsequently be seen.

The preamble of the Medical Law, B. E. 2466, is translated—the italics being introduced for the purpose of emphasis—as follows:—

"Whereas the practice of the art of healing including the use of medicine has an important influence on the well-being of the people;

"Whereas in this Realm of Siam such practice is at present without regulation and control leaving the general public without adequate protection against the dangers arising from the practices of ignorant and untrained persons;

"And Whereas it is deemed expedient to *control, regulate* and *raise the standards* of the practice of the art of healing;

"Therefore be it enacted as follows:—"

"The art of healing" is defined in the Law and the Amendment as including the "practices of medicine, surgery, obstetrics, dentistry, pharmacy, midwifery, nursing, massage or treatment of the sick or ailing by any method whatsoever".

The first drafting committee, in its covering report, postulated that the conditions of practice of the curative arts then prevailing in Siam, differed materially from those which existed in nearly all European countries and in America, in that the medical profession in the latter countries has been established upon a scientific basis and under control for many years; whereas in Siam almost the reverse was the case. This remains nearly as true to-day as it was eight years ago. It may have been gathered from under the preceding heading that the actual proportion of the qualified to the unqualified, (roughly estimated at 1 to 40) and also comparatively to the total requirement of the Kingdom (already shown as equivalent to a shortage of over 90%)

is practically negligible. Any plan for registration must, in order to be practicable and *realistic*, include the class of unqualified and untrained practitioners, in which are to be found the overwhelming majority of persons upon whom by far the greater part of the population of the country—not only in the rural, but especially in the urban districts—necessarily depend for their medical care or else entirely do without it.

The objects of the Medical Law is not only to register practitioners in order to protect the public against malpractice by irresponsible and dangerous persons, but also to *limit within safe boundaries the practice of all unqualified but bona fide practitioners* in the Kingdom. By the direct means of education as well as by an indirect process of gradual elimination it is the national policy to raise the standard of medical practice. For the last purpose, the Ministerial Regulations, issued under the Law, provide for periodical renewals of licences of all practitioners except in the highest grade, defined as those who practise "in any branch of the art of healing who hold certificates of proficiency in that branch from the Ministry of Public Instruction or from any school which in the opinion of the Medical Council ensure an equal standard of proficiency." Apart from this feature of the Siamese law, *believed to be unique*, the Medical Law provides for the usual powers of licence and registration as well as for legal proceedings and penalties.

The Law is supplemented by the Regulations which deal with the conduct of meetings of the Medical Council, the election of its Non-Official Members, details of registration, licensing and re-registration, revocation and reinstatement of licences, local record of licences, designation of grades, limitation of medical practice, fees and professional conduct.

As to the Medical Council itself, it is composed, apart from its President, of eight Official Members, representing the Ministries of the Interior and Public Instruction, the Department of Public Health, the Army and Navy Medical Services, the Faculty of Medicine of the Chulalongkorn University, the Red Cross Society and the Medical Asssociation of Siam. Under Section 4. C.,

"Not less than two nor more than seven Un-Official Members elected at a general meeting of the Medical Council and selected to represent the registered practitioners of the art of healing in general practice in Siam complete the composition of the body which is a juristic person." Other senior officials of the Council are the Vice-President elected by itself for a term of office, and the Secretary-Registrar, who must be a qualified physician holding a certificate from a recognised medical school.

The powers and duties of the Council are as follows:— Under "Section 8. The Medical Council shall draft Ministerial Regulations for the purposes of this law...". It is also provided by Section 9. that "A. The Medical Council shall be empowered to grant licence to any person to practise..., to register such licensed persons, to make such enquiry or investigation as may be necessary...(and) to determine the fitness of any person to be registered under this law... B. The Medical Council shall act as an advisory body to the Ministry of Education (now Public Instruction) regarding the standard of teaching, examination and proficiency to be attained...".

The Medical Law is now in force in the Metropolitan Area. Its extension to the Circles of the interior is under consideration, and it is hoped that within a year or two the entire Kingdom will be brought under regulation.

The following tables give details of grading as well as other data concerning practitioners in the different branches in the Metropolitan Area:—

TABLE I.

PRACTITIONERS IN THE MODERN ART OF HEALING.

Medicine, Surgery & Obstetrics		Dentistry		Pharmacy		Midwifery		Nursing	Massage	Total
Qualified	Un-Qualified	Qualified	Un-Qualified	Qualified	Un-Qualified	Qualified	Un-Qualified	Qualified	Qualified	
183	74	3	56	25	110	150	14	16*	..	631

*The majority of qualified nurses are registered as midwives (see Table III).

TABLE II.

PRACTITIONERS IN THE EMPIRICAL ART OF HEALING.

Medicine	Pharmacy	Midwifery	Massage	Total
1,850	631	222	179	2,882

TABLE III.

Countries from which Degrees and Diplomas were obtained	Medicine Surgery & Obstetrics	Dentistry	Pharmacy	Midwifery	Nursing
Siam	141	—	18	142	10
U. S. A.	12	—	—	2	—
England	13	—	2	1	4
Germany	4	—	4	—	1
France	2	—	—	—	—
Denmark	1	—	—	—	—
Switzerland	1	—	—	—	—
Russia	1	—	—	—	—
Hongkong	2	—	—	—	—
Japan	1	—	—	—	1
China	2	1	—	—	—
India	3	1	1	—	—
Belgium	—	1	—	—	—
Indo-China	—	—	—	1	—
Philippines	—	—	—	4	—
Total	183	3	125	150	16

Future Probabilities.

"In its *first stage*," wrote Dr. Leslie Mackenzie, "public health is the application of scientific ideas to the extirpation of *environmental* disease. In its *second stage*, it is the application of scientific ideas to the production of *personal immunity*. Everywhere, it is the synthesis of prevention and cure." The italics are inserted by the present writer with the expectation that the reader who has taken the trouble to follow the underlying ideas contained in the foregoing pages will not fail to grasp the fact that the public health movement in Siam, virtually begun fifteen years ago, has hardly emerged from its "first stage."

An attempt has been made to show that the national Health Authority is concerned at this particular juncture with the conditions of environment that affect the health of the individual.

In this capacity, the Authority exercises powers in relation to such matters as water supply, drainage, cleansing and general sanitation. In the second place it begins and hopes to exercise more duties which have for their object the conservation of health or the prevention of disease in the individual. In this capacity it is beginning to concern itself with maternity and, under certain stipulated conditions, with infant welfare, tuberculosis, leprosy, venereal and other diseases. It believes its plan for vaccination to be complete; while increased provisions for organized medical services will most likely follow greater public endowment of medical education, properly orientated, it is to be hoped, in the direction of *service* rather than in that of professional venture.

Professor Bastable in his universally acknowledged classic, "Public Finance," declares: "It is not conducive to the interest of the nation to concentrate all administrative authority in a single centre. The gains from centralization may be great, but to obviate the evils that accompany it, a wise decentralization is also requisite. Having secured political unity, it becomes the task of the statesman to so distribute the functions of government as to obtain the best political and financial results. The earlier historical movement that has led to combination needs to be supplemented and corrected by the rational process of division of duties." The application of this universal truth to the present state of public health and medical service in Siam is more than obvious. It is in fact inevitable and urgent. If a material evidence were needed, the fact that the Department of Public Health daily deals with an average of over one hundred and fifty documents of correspondence fully proves that the limit of central responsibility in health matters is reached. The proverbial "last straw" of centralization can only be avoided by undelayed assignment of duties to local authorities. Remarkable as it may seem, but a logical outcome of the national policy, it is the same department that was entrusted with the first complete draft of a Municipal Law which, in its present form, is a veritable public health code. There are reasons to believe that, in spite of certain difficulties of adjustment, the following year should see its pro-

mulgation and enforcement in some of the existing Sanitary Areas not excepting that of the Capital.

It is readily to be admitted that further provision is needed for the continuous acquisition of knowledge and the prosecution of national and local researches, in order to furnish proper bases for future practical policies. But at the same time it is an undeniable truth that it is far more preferable to err along the path of *application* of limited knowledge than to stray in the empty wilderness of unapplied or even inapplicable abstractions. Here again it will be seen that rapid extension of medical as well as other scientific training is imperative. Public health progress starts at the rail-head of Elementary Education and its temporary terminus must be at the rail-end of Higher Education.

As an echo, pleasing to the sympathetic ear of any one who is sincerely devoted to the cause of civilization and humanity, it may be finally reiterated with the doubled maxim that *both health and education are purchasable commodities.*

Evening, Wat-Lieb

legislation and enforcement in some of the existing Sanitary Areas, excepting that of the Capital.

It is readily to be admitted that further provision is needed for the continuous acquisition of knowledge and the prosecution of national and local researches, in order to furnish proper bases for future practical policies. But at the same time it is an undeniable scientific truth that it is far more preferable to err along the path of application of limited knowledge than to stray in the empty wilderness of unapplied or even inapplicable abstractions. Here again it will be seen that rapid extension of medical as well as other scientific training is imperative. Public health progress starts at the post-head of Elementary Education and its temporary terminus must be at the rail-end of Higher Education.

It is an echo, pleasing to the sympathetic ear of any one who is devoted to the cause of civilization and humanity, to hear frequently reiterated with the doubled maxim that *both health and medical aid are purchasable commodities*.

F.S.HARROP

CHAPTER XIV

BANGKOK WATERWORKS

The works for the supply of Bangkok with potable water were solemnly inaugurated by His Majesty King Rama VI. on the 14th of November 1914, and the service was commenced from that date.

Before that memorable event, the population of Bangkok, numbering about 330,000 inhabitants (1) had only very poor resources in water supply. Rain water collected from the roofs was used during the wet season, and stored by those who had the means to do it. When rain water was no longer available, water had to be taken from the river, from the numerous klongs (canals) intersecting the town, and from the ponds and ditches excavated around the habitations. Only those who have seen the old Bangkok klongs can imagine to what extent this water was polluted.

An old company pumping the water from the most polluted part of the river in the Chinese quarters, distributed this water without any treatment, by intermittent service, to the few quarters of the southern part of the city where klong water was not easily obtainable.

Among the middle classes of the population, the water was clarified, if not purified, by treating it with alum in earthenware jars by the old process in use in ancient Egypt.

A few artesian wells bored during the preceeding ten years supplied a comparatively pure water to a few fortunate establishments, but the amount of water derived from this source was practically negligible as compared with the needs of the population.

The conditions regularly turned to the worse during the dry season when, as is explained later, the water becomes and remains brackish for several months, the pollution from the town being at

(1). The population on the east bank is approximately 280,000, and about 50,000 inhabitants are spread over a large area on the west bank.

the same time much aggravated by the ebb current in the river.

As soon as the new supply was started, the street fountains became very popular, and were well patronized. All classes of the population eagerly availed themselves of this commodity, quite new to Bangkok, which contributed so much to the improvement of the conditions of life in the capital.

Source of Supply.

No other source of supply being available, the only alternative was to take the water from the River Chao Phya at a suitable place, and to have it conveyed to Bangkok and treated by the most approved process before being distributed.

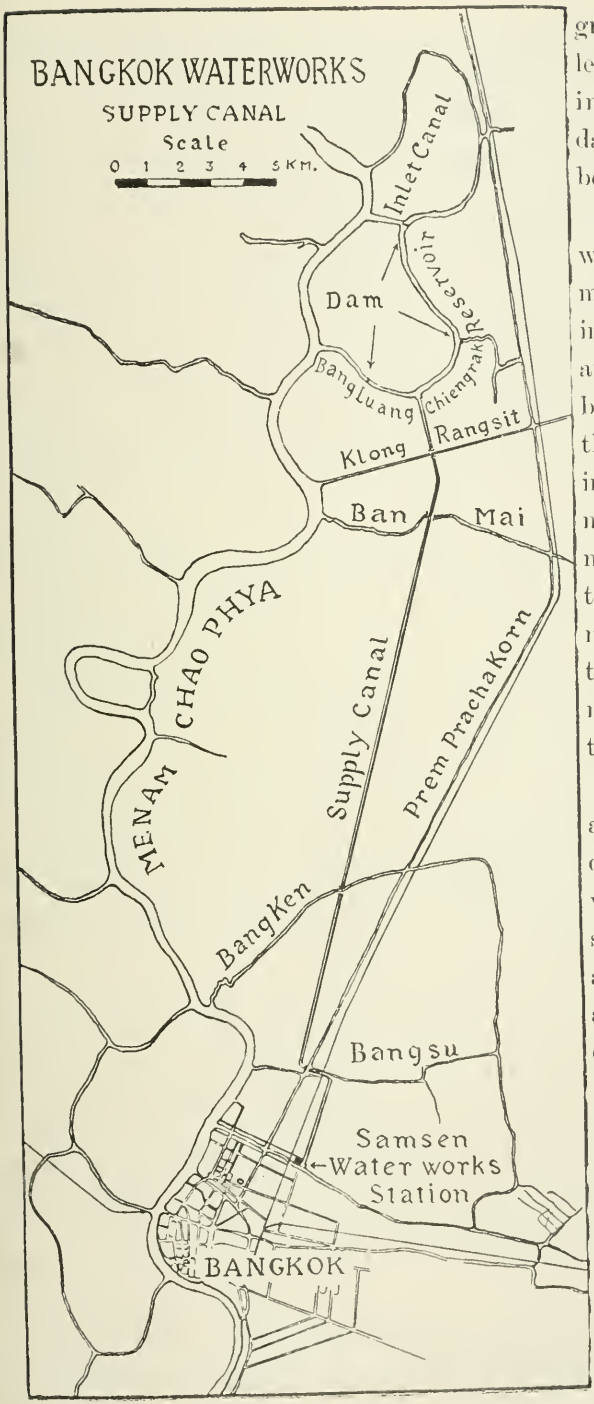
The Menam Chao Phya is fed by four large tributary streams. For a distance of about 200 kilometres, this river passes through a low lying alluvial plain, and is tidal on about half this part. Towards the end of the rainy season, it overflows its banks over the greater portion of this alluvial plain. Owing to the influence of well marked dry and wet seasons, the condition of the river water varies greatly, not only during the year, but also from one year to another.

Bangkok is situated on the Menam Chao Phya, chiefly on the east side, about 52 kilometres from the sea following the windings of the river. Salt is found in the river water at Bangkok in quantities exceeding the usual limit during about two months and a half, from March to May, in normal years, and during five or even six months from January to June, in exceptionally dry years. Quantities of sodium chloride exceeding 2 grams per litre are quite usual, exceptionally rising to 4 grams. The brackish water in ordinary years goes up the river 24 kilometres above Bangkok, and even 30 kilometres in very exceptional years.

The intake gates situated at Wat Samle, 41 kilometres above the Royal Palace and far from any agglomeration, are therefore safely out of reach by either the brackish or the highly polluted water.

Supply Canal.

The Klong Bang Luang Chiengrak, an old branch of the river, has been converted into a large reservoir throughout a



great part of its length, by erecting two earth dams across its bed.

An intake sluice with three gates 4 metres wide, opening and closing automatically, has been provided at the mouth of an intake canal 1,200 metres long, 18 metres wide on the surface and 4 metres deep, for the filling of the reservoir at high tide.

A diverting canal round the south dam, provided with a navigation sluice, allows the access of boats and eventually of dredgers into the reservoir.

This reservoir has a length of 8 kilometres, widths varying between 60 and 100 metres and depths from 2 to 6 metres. Its

normal capacity, which depends upon the possible variation in the water level, is approximately 200,000 cubic metres.

From Klong Bang Luang Chiengrak the water is conveyed by means of a supply canal 26 kilometres long, 13 metres wide on the surface and about 3 metres deep, to the Waterworks Station on the north-east boundary of Bangkok.

Two automatic gates, 4 metres wide, opening themselves at low tide, provide an outlet to the river, through Klong Samsen which has been deeply dredged accordingly. The closing of these gates at high tide prevents the river water from entering the supply canal. The lower part of this canal is thus emptied during low tide to a very low level, and at the same time thoroughly flushed.

The filling of this emptied section during the closing of the gates at high tide contributes to maintain an efficient and fairly constant velocity in the upstream part of the canal which is fed continuously from the high level water in the reservoir. The water in the whole sytem is thus kept in good condition, and no silting up of the supply canal has yet been noticed.

Great precautions have been taken to protect this supply canal against pollution, in order to take full advantage of the natural purification of the water flowing for 26 kilometres exposed to the action of the air and the sun. Two earth embankments running along the banks prevent any flow of water from the adjoining fields or gardens.

As it was necessary to interfere as little as possible with the irrigation, drainage and navigation through the existing klongs crossed by the supply canal, three reinforced concrete syphons have been built under the waterways of Klong Rangsit, Klong Bangsue and Klong Prem. A reinforced concrete culvert has also been laid under the supply canal at Klong Ban Mai for irrigation and drainage purposes.

Seventeen bridges have been erected, giving full facilities for crossing the canal.

A Royal Decree forbids, with proper penal sanctions, navigation, fishing, bathing, washing and any action which would cause

a pollution of the water.

Seven stations for the canal-keepers and coolies are erected at the main works along the whole system. The canal-keepers are under a responsible Chief Inspector stationed at Chiengrak with four gendarmes at his disposal.

The organization is completed by a telephone line connected with the Waterworks Central Office.

Owing to these precautions, the water reaches the Waterworks Station in a much less polluted condition than at the intake.

An emergency reinforced concrete pipe, 1.10 m. in diameter, could be used to take water temporarily from the river at Samsen, during the high water season, for the few days which would be required for diverting the supply canal in case of the syphons needing repairs.

A flushing tank is provided for the thorough flushing of this pipe before use.

Pumping Plant.

Electric power is supplied by a Government Power Station established for centralizing the production in view of lowering its cost. Power being available in that form, centrifugal pumps were adopted, as a matter of course, driven by asynchrone motors fed with the primary three-phase 50 periods 3,500 volts current without transformation. A transformer reduces the tension to 100 volts for the small auxiliary motors and the light.

The raw water is pumped from the canal to the settling tanks by two low-lift centrifugal pumps, each having a capacity of 320 litres per second against a total head of 9 metres, driven by 60 H. P. motors at a speed of 720 revolutions per minute. One pump is normally in use while the other is in reserve.

The filtered water is pumped from a low storage reservoir and forced in the distributing main by three high-lift centrifugal pumps, each having a capacity of 250 litres against a head of 30 metres, driven by 160 H. P. motors at a speed of 960 revolutions per minute.

The total capacity of the plant is 26,000 cubic metres per day, with two pumps working during the night, the third unit

being in reserve.

A small air pump 200 m/m in diameter 200 m/m stroke driven by belt by a $3\frac{1}{2}$ H. P. motor is provided for priming the pumps when necessary.

Room is provided for the addition of two more pumping units.

The pump house is 33 metres long and 8 metres wide, inside measurements. All electric cables and water pipes are located beneath the floor.

The electric switchboard is situated at one end. A cabinet at the other end contains a complete set of recording or registering instruments, including two Venturi water metres, for the hydraulic control of the whole installation.

Coagulation, Sedimentation and Rapid Filtration.

The turbidity of the raw water is subject to great and sudden variations, the most noticeable increases occurring after the heavy rainfalls at the beginning of the rainy season. From October to April or May, the turbidity, measured with the scale of the U. S. Geological Survey, averages 80 to 100, with frequent increases to 150, and the amount of suspended matter ranges from 20 to 80 parts per 1,000,000. From May or June to September, the turbidity averages 120 to 170, but 250 or 300 are frequent figures, and 400 has been recorded once. The amount of suspended matter during the same season averages 200 to 300 and has exceptionally reached 500 parts per 1,000,000. In November or December the turbidity is not in proportion to the amount of suspended matter, owing to the degree of fineness of the latter.

It would not have been possible to filter this water without a preparatory treatment. The system of treating the water with a coagulant for a quick sedimentation and a rapid filtration, known as the American system of filtration, has been selected as the most suitable for treating the raw water available. The coagulant used is sulphate of alumina. The following reaction takes place:

$$Al_2(SO_4)_3 + 3CaCO_3 + 3H_2O = Al_2(OH)_6 + 3CO_2 + 3CaSO_4$$

In plain words, the acid contained in the sulphate of alumina

unites with the alkaline bases of the carbonates of the water thereby liberating the carbonic acid which is absorbed by the water, and setting free the insoluble aluminum hydrate which is precipitated. This hydrate coagulates into gelatinous particles which aggregate the suspended substances of the raw water, mud, organic matter and also bacteria, and carry them down to the bottom of the settling tanks.

The alkaline carbonates of the water are partially changed into sulphates, the amount of bases being not altered. The amount of sulphates in the water after treatment remains well within the limit quantities usually admitted in potable waters.

The total hardness of water is not changed during the process.

The sulphate used is a very pure preparation absolutely free from arsenic.

The amount of carbonates in the raw water is liable to decrease below the required amount for the precipitating of the alumina. Such a decrease is very exceptional, and up to the present has occurred during five days only in October 1918, and during 16 days of the rainy season in 1923. At such times this deficiency has been made good by adding exactly the required amount of sodium carbonate of a very pure quality.

These details are given with the purpose of showing that all precautions are taken to prevent even the smallest amount of alumina remaining in the filtered water.

The water after about two hours sedimentation contains only some fine coagulated particles and bacteria which are retained by the sand filter-beds. The most efficient part of the filter-beds is the thin gelatinous layer formed upon the top of the sand by these particles, which allows a rate of filtration of 120 metres in 24 hours, or 40 times the usual rate in the slow sand filters treating uncoagulated water, with an equally high efficiency. This very high rate fully justifies the term of "Rapid filtration" applied to this system.

Description of the Plant.

We shall now see how the above described operations are carried out in practice.

A weak solution of sulphate of alumina made in wooden tubs on the third floor of the coagulant house is distributed through regulating cocks fed from a constant level gravity box, at the uniform rate of one litre solution per minute for each working filter. A lead pipe conveys the solution by gravity into the raw water forcing main. A very good mixing of the coagulant with the water is ensured by the flow of the latter in this main up to the settling tanks. The quantity of coagulant used per cubic metre of water ranges from 24 to 34 grams of sulphate containing 18% $Al_2 O_3$, according to the condition of the raw water.

The settling tanks, built in reinforced concrete are divided into four sections, each having a capacity of 760 cubic metres. Each section is provided with five baffle partitions. Two sections are kept in use during 10 days, after which they are replaced by the two others and cleaned.

The water flows from these tanks to the filters by gravity. There are twelve circular steel filters of the Jewell gravity low type. The filter-bed, 5.18 m. in diameter is composed of a fine sand bed 1 metre thick, resting on a thin layer of gravel.

The collecting system embedded in this gravel consists of drain pipes provided with small brass strainers The water flows through the inlet into an annular space around the filter. An automatic inlet regulator maintains a constant level over the sand bed.

An automatic controller, of the Weston type, regulates the rate of filtration and maintains it perfectly uniform whatever be the condition of the filter-bed. The loss of head through the filter varies from 0.80 to 3 metres approximately. A wash indicator shows this loss of head, and the point of washing the filter. In case of this point being accidentally passed, the Weston controller closes the outlet automatically and stops the filter.

The washing of a filter is carried out by forcing filtered water from a special reservoir through the collecting system and the filter-bed, while the sand is thoroughly stirred to its entire depth by agitators electrically driven. The water is evacuated through the inlet annular space. This operation takes about 6 or

7 minutes with a water consumption of about 60 cubic metres

The filter is then put in "rewash", or in plain words the first filtered water is wasted for a period of 30 minutes. This rewash allows the formation of the gelatinous film with an ample margin of security, the usual time required for this being about 10 minutes. Then the filter is put again into normal working.

A filter works from 15 to 60 hours according to the condition of the raw water.

The twelve filters, including all the mains, valves, indicators, the 15 H. P. electric motor and shafting for driving the agitators, etc., are sheltered in a spacious building 44 metres long by 16 metres wide, inside dimensions.

From the Weston controller's outlet the filtered water falls into a masonry flume and goes by gravity to the low filtered water reservoir. This fall contributes to a certain extent to the aeration of the water.

The low filtered water reservoir, measuring 54 metres by 36 metres with a total capacity of 5,700 cubic metres is entirely built of reinforced concrete, and is covered with a thick layer of earth. It is divided into two sections for cleaning, and all its ventilation openings are lined with wire gauze ensuring a perfect protection against mosquitoes, flies, insects, lizards, etc. The overflow drain is, for the same purpose, water sealed. From this reservoir the water is pumped into the distribution system.

The efficiency of the plant is closely checked by daily observations of the turbidity of both the raw and the settled water, and of the colour of the filtered water. The figure found for the turbidity of the settled water shows at once if the amount of coagulant used is correct. The alkalinity is measured twice a day when a deficiency is noticed.

Bacteriological examinations are made daily at the laboratory of the Medical Officer of Health, and the chemical analyses are carried out monthly at the laboratory of the Ministry of Commerce and Communications.

Advantages of the Rapid Filtration over Slow Sand Filtration.

After this description, it is well worth pointing out the ad-

vantages of this system and the reasons which have lead to its adoption.

1. The preliminary treatment of the water by a coagulant is quite simple and the two hours sedimentation is carried on in settling tanks which can be very easily cleaned. Without coagulation, the removal of suspended matters is a most difficult problem requiring the passing through several stages of roughing filters with shallow beds of various grades of gravel and coarse sand filters before the final filtration. The cleaning of these various roughing filters is a most difficult and expensive operation.
2. The rapid filters take a considerably smaller area than slow sand filters, forty times less, not counting the roughing filters required with slow sand filters. Their first cost is therefore much smaller.
3. The rapid filters are well sheltered and consequently protected from the sun and from the wind or rain storms which are causes of evaporation or disturbance of the filtering film.
4. The rapid filters require a smaller staff and are operated from outside, without any risk of pollution.
5. The time for cleaning rapid filters is indicated mechanically without any doubt, and there is no necessity of waiting the results of bacteriological examinations.
6. The system is easily adaptable to the variations in the character of the water, by varying the amount of coagulant used.

Summing up, the rapid filtration system has an indisputable superiority over slow sand filtration which is still more marked in the treatment of turbid waters subject to great variations in character.

Distribution System.

The filtered water is forced by the high lift pumps into a distributing main 700 m/m in diameter and about 4 kilometres long which is connected to the bottom of the Elevated Reservoirs near

the centre of the distribution system. These reservoirs, two in number, have each a capacity of 1,000 cubic metres, with overflow 24 metres above ground. They are built entirely in reinforced concrete, covered and provided with ventilation openings lined with wire gauze.

The offices, workshops, godown, laboratory for testing metres etc., are located on the same site.

The distribution system, spread over a large area, include, 125* kilometres of cast iron mains from 700 to 80 m/m diameter.

The rubber ring joints, adopted on account of the soft nature of the ground and of the unavoidable presence of surface water in the trenches, have saved greatly in the cost of laying, and have proved very efficient in numerous cases of sinking of the mains.

A very wise policy has been adopted for the distribution of water to the poorest classes of the population, in the erection of not less than 390 public street fountains. 235 of these fountains are fitted with a 100 m/m fire hydrant enclosed in the body. These hydrants have on numerous occasions played an important part in controlling fires at the outbreak.

The water is sold through metered services at the reasonable price of 25 satangs or about 6d. per cubic metre. Decreasing rates are applied to large consumptions.

The development of the metered services has been greatly handicapped not only by the scarcity of and the high prices paid for material during the war, but chiefly by the facilities given to draw free water at the street fountains. Nevertheless, the number of customers has recently reached 7,700.‡ All wharves are equipped with hydrants for supplying water to shipping.

Extensions to the distribution system are carried out every year, and a scheme is under consideration for the distribution of water on the west bank. The naval establishments are already supplied through a 100 m/m syphon laid across the river. The want of proper roads in these quarters has been the cause of the delay in carrying out a general scheme.

*At the end of B. E. 2472.

‡Figures shown at the end of B. E. 2472.

The daily consumption is in constant progression. It varies from 15,000* to 22,500* cubic metres, the highest figure being reached during the dry season, when people from outer districts come in great numbers with their boats laden full of jars, drawing water day and night from the fountains standing near the waterways.

The highest consumption corresponds to about 47 litres per head and per day. This low figure shows that there are still good prospects for the development of the sale of water.

The present daily capacity, as explained, is 26,000 cubic metres, and everything has been foreseen for an easy duplicating of the plant, providing an ample margin for the future.

Quality of the Water Distributed.

The results attained in the purification of the water are well summarized in a yearly report issued at the end of November 1921 by the Medical Officer of Health which is reproduced hereafter :

" BACTERIOLOGICAL ANALYSIS. This is done daily. The water has always been well within the margin of safety as laid down by all competent authorities both in respect to the actual bacterial content and the number of c.c. which must be examined before intestinal organisms are found. The former figure has usually been in the neighbourhood of 12 which is very low and invariably well below that of 100 which is permissible. The latter figure has seldom been below 20 and frequently been 30 and over which is two or three times better than the figure 10 which is in this case permissible.

" The efficiency percentage which is not so important a matter as the two factors already referred to has usually been 98% (a high standard) and seldom less than 96%.

" CHEMICAL ANALYSIS. This is done monthly. Not only has there never once been any chemical evidence of harmful pollution but on the contrary every analysis shows a high state of purification. The water has always been a soft water.

*Figures shown at the end of B.E. 2472.

"These two analyses have been systematically carried out on all the waters commencing at the raw water as it enters the filter station and ending at the various taps throughout the city.

"CONCLUSION. This inspection shows that not only is the filter plant doing its work very efficiently but that the water supplied to Bangkok is an excellent potable, washing and commercial water and compares most favourably with that supplied to most of the cities throughout the world."

This report, confirming as it does the efficiency of the safeguards employed, forms a fitting conclusion to the description of the methods in use in the Bangkok Waterworks.

This somewhat detailed description has been prepared with the hope that it may contribute to the confidence of the public in the daily use of that great commodity which is now at its disposal, namely, a pure and abundant water supply.

Note: Since the above report has been issued (in 1922), some important extensions have been carried out, viz. :—

1) Erection of New Settling Tanks with a total capacity of 4,400 m^3.

2) Erection of a New Filter Plant with daily capacity of 45,000 m^3.

3) Erection of a Chlorination Plant for sterilizing the filtered water.

CHAPTER XV

SCHOOL HEALTH SERVICE

The School Health Service scheme prepared by His late Royal Highness Prince Mahidol of Songkhla, M. D., C. P. H., was adopted by the Ministry of Public Instruction in 1924 for a probationary period, during which data were collected in order to form the basis of future work. In this work the Ministry was joined by the Health Section of the Siamese Red Cross Society who readily co-operated on account of their special interest in Junior Red Cross work.

The chief aims of the School Health Service are: —

1. Health Education;
2. Supervision of school sanitation and control of infectious diseases;
3. Medical inspection and correction of defects;
4. Studies of health statistics in the schools.

Health Education.

This important phase of the work is aimed at educating school children, and also their teachers and parents in physiological factors and the formation of health habits. Hygiene and Sanitation is included in the school curriculum. Red Cross nurses are rendering invaluable service in this respect.

Sanitation.

Regulations are laid down for school buildings concerning location, construction and drainage, water supply, ventilation and illumination, and other sanitary facilities.

New Government Schools are usually of modern construction; attempt is also made to improve the old ones. In opening private schools permission must be secured from the Ministry of Public Instruction, who have to be satisfied that they are on a sound basis with regard to questions of sanitation. The schools are regularly inspected by Medical Officers. Since 1928, 384 private

The rout of the Burmese at Ayudhya

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schools have been inspected.

The Control of infectious diseases is within the scope of the activities of the Public Health Department. For this purpose Red Cross nurses are detailed to assist the teaching staff in girls' schools in Bangkok. Suspected cases are reported and investigations are made by Medical Officers of the Communicable Diseases Division. Further treatment is carried out by the nurses under supervision of a physician.

First aid outfits are installed in schools where the nurses assist, and instruction and demonstrations are given by them; while in boys' schools, first aid is included in the Boy Scout syllabus.

Medical Inspection.

This phase of the work is thoroughly carried out in the Government Primary and Secondary Schools in Bangkok. Entrants are subjected to medical inspection, and scholars are repeatedly inspected every other year and also before leaving the Secondary Schools.

A medical inspection team is composed of 3-4 physicians, a school nurse and a few teachers. 15,512 scholars were inspected in 1929 from 22 schools of which 88 per cent. were found to have physical defects among boys, and 86.7 per cent. among girls; the defects may be classified as follows:—

	Boys	Girls
Intestinal parasites	52.3	47.5
Dental caries	33.4	47.3
Skin diseases	33.1	20.1
Eye diseases	24.9	30.3
Diseases of Ear, Nose and Throat	9.2	9.6
Diseases of Lungs and Heart	5.8	7.7

These figures show the immediate need in our schools, and also indicate that the Service should take a permanent place in the scheme of our education.

Parents are notified when a child is found defective; the treatment can be done either by the family physician or in hospitals and health centres recommended by the Service, free of

charge. Treatment for intestinal parasites is given at schools. Teachers and School nurses are mainly responsible for the follow-up work. Scholars' homes are visited in order to secure parents' co-operation in carrying out the School physician's instructions.

In B. E. 2472 a considerable number of cases were treated; the percentages are as follows :—

	Boys	Girls
Intestinal parasites	86.5	79.2
Diseases of Ear, Nose and Throat	63.1	54.6
Dental caries	62.9	53.5
Eye diseases	58.2	43.6
Skin diseases	57.1	35.8

Research work.

Along with their routine work the School Medical Officers also keep statistics on the health of the scholars. This will constitute a sound basis for the work in future. Some of the subjects under study are :—

1. Anthropometry of Siamese children;
2. Data that will show the advantage of this Service;
3. Prevalence of diseases among scholars.

No definite statement in regard to the standard of height and weight can at present be made, as data secured are not sufficient for statistical study.

Intestinal parasites among school children in Bangkok are approximately 50.3%; of these 8.7% is Hookworm, 3.27% Tapeworm and 15.7% Ascaris lumbricoides, etc. Trachoma prevails in about 16 per cent.

The work described above has now passed the experimental stage, and will be further extended. Some local authorities and Health Officers in the provinces are convinced of the benefit derived from such health supervision, and are introducing the scheme in their local schools.

CHAPTER XVI

THE ARMY MEDICAL SERVICE

The Army Medical Service is a department entailing firstly the prevention of disease and secondly the care and treatment of the sick and wounded. The Head of the Service is directly under the Under-Secretary of War. The officers are charged with :—

I. The duty of recommending to general and commanding officers verbally or in writing any precautionary or remedial measures relating to garrisons, barracks, hospitals, movement of troops, food, transport, encampment, billets, bivouacs, clothing, physical training, drill, and all other matters which may induce the preservation of health of the troops and prevention of disease in the army.

II. The professional treatment of the sick and wounded, the replenishment of medical equipment, and the preparation of medical statistics.

III. The standard of training for the Army Medical School and the Army Medical Corps, and teaching of hygiene and sanitation to officers amd men.

IV. Supervision of various Medical Units of the Army.

Organization.

Army Medical Units. There is a hospital in each army Division which has a senior medical officer in command, a surgeon and assistants, a physician and assistants, a dentist and a pharmacist with a certain number of rank and file from the Army Medical Corps, as warders and nurses.

Regimental Medical Units. There are one to two medical officers in each battalion of infantry or each group of cavalry or artillery, with two senior non-commissioned officers, one acting as an assistant in clerical work, and the other as an assistant in sanitary work of the battalion, and one junior non-commissioned

officer in every company, squadron or battery.

The Army Medical Department is divided into 5 sections, viz: (1) the Administration, (2) the Medical Section, (3) the Bacteriological Section, (4) the Chemical and Pharmaceutical Section, and (5) the Medical Store. With these is incorporated the Army Medical School.

All the medical officers stationed at various medical units are in technical matters under the command of the Director of the Army Medical Service. He is assisted by the Deputy Director of the Medical Service. The commanding medical officer of the Division takes direct responsibility in all sanitary matters and in the treatment of the sick and wounded, but in administrative work is under the commander of the Division.

Some figures.

The following figures may be of interest:—

1. Average weight of a soldier	54.15 Kg.
Average height	162.83 cm.
Chest-expansion	84.40 cm.
At end of expiration	80.55 cm.

2. Common diseases:

Skin 5.6%

Oral and dental, chiefly gingivitis, dental abscess, and caries, 0.63% in the first year conscripts, and 0.15% in the second year the reduction being due to treatment and taught hygiene.

Framboesia. 9.63% in the first year, and 2.86% in the second year. Treatment with neosalvarsan is instituted.

3. Survey and treatment of *helminthic infections* of the intestine, especially hookworm, in association with the Public Health Department of the Ministry of Interior. Last year 24.8% of men were found infested with hookworm and 17.79% with other worms.

4. *Seven-days fever.* 18.28% of men were ill with this fever almost throughout the year. Cases appeared from April and then increased in number. The decline was noted in December.

5. *Malaria.* 3.23 cases in 100 men with death of 0.7%. The infection is heaviest between April and January. Most of

A Regimental Medical Unit.

the cases took the benign forms, but at Chiengmai in the Northern Province the malignant form was not infrequently met with.

6. *Amoebic dysentery.* Cases 2.39%, heaviest in May, June, July, August and in December and January.

7. *Mumps.* 12.05%, from April to March.

8. *Diseases of the Nervous System.* 1.88%.

9. *Respiratory diseases.* Lobar pneumonia 1.11%; 12.97 death per 100 cases.

Time: from May to August (hot, wet months).

10. *Venereal diseases*:

Gonorrhoea.

Acute gonorrhoea	24.19	cases in 1,000 men
Complications	1.03	do.
Total	25.22	do.

Syphilis.

Stage 1.	18.28	cases in 1,000 men
Stage 2.	1.41	do.
Stage 3.	0.41	do.
Hereditary	0.08	do.
Total	20.18	do.
Soft chancre	9.08	do.
Total of V. D.	54.48	do.

Progress of the Service will depend generally upon two factors, viz.: the better understanding of hygiene and sanitation amongst the populace, and higher standard of Medical Education. These are advancing; and so it is hoped the future of the Army Medical Service will see the officers and men with stronger physique and higher efficiency.

CHAPTER XVII

VETERINARY SERVICE

Plagues of animals in Siam are numerous and it is of great economic importance that they should be eradicated for, not only do they involve the farmers in grave financial loss, but they in addition interfere seriously with the export trade in livestock, which is subject to interruptions on their account.

Certain diseases are characterized by the alarming rapidity with which they spread from one end of the Kingdom to the other. Others recur at fairly regular intervals and are seasonal in character. Measures of control are necessary for the prevention of the dissemination of these diseases both within the Kingdom and to neighbouring countries. Control involves segregation, quarantine and vaccination. Siam has a wealth of livestock as the following figures indicate:—

Year	Elephants	Horses	Cattle	Buffaloes
2471	9,390	297,827	4,408,491	4,570,527

Pigs, sheep and goats are not enumerated. There are few sheep, more goats, and a great number—probably some millions—of pigs.

It is realized that a numerically strong veterinary division and adequate finances are necessary for the successful prosecution of any campaign against disease which may be undertaken. The Government has therefore increased the staff from 42 to 101 veterinary officers, and has voted an extra 500,000 ticals for veterinary purposes to meet the situation.

The Veterinary Division of the Ministry of Lands and Agriculture comprises four sections. These being Animal Husbandry, Serum Production, Meat Inspection and Disease Control. Certain officers are stationed in the provinces to deal with outbreaks of disease, and a mobile section of veterinarians exists with the base at Bangkok for distribution in those areas in which concentrated

efforts are necessary.

Of diseases Rinderpest and Haemorrhagic Septicaemia rage with great vigour, and are widespread in distribution. Six years ago Rinderpest existed throughout Siam. Methods of eradication hitherto adopted whereby the disease was fought wherever it appeared, had to be discarded as not affording permanent results; and a gradual but continuous policy of eradication has to be substituted. This meant the temporary abandonment of portions of Siam to the ravages of the plague, which allowed a concentration of forces to thoroughly clean up other portions; and after cleansing the prevention of reinfection. The policy was to work from the most southern border northwards. By this means four years ago the whole of the Siamese peninsula was cleared of Rinderpest since which time no other case of that disease has been observed there. Thus about two million cattle and buffaloes have been safeguarded and it is hoped that the protection thus afforded will be permanent. An extension of this work is proceeding and judging by what has been accomplished it is believed that in about two years another two million or so cattle will be similarly protected. By continuous afforts it is hoped that Siam will eventually be freed from Rinderpest. Also six years ago attention was directed to the prevention of Haemorrhagic Septicaemia which ravaged the herds of cattle and buffaloes. The Veterinary Division undertook experiments with the object of producing a reliable vaccine and serum. Both were prepared after the method of Holmes and proved highly efficacious. 194 elephants, 43,084 cattle and 157,150 buffaloes have been vaccinated with beneficial results. The Saovabha Institute now produces this vaccine in large quantities.

Experiments were also undertaken to produce anti-rinderpest serum, mainly to make Siam independent of foreign supplies, and on the score of economy. A tract of land about 4,000 acres in extent has been acquired which will be converted into a farm, with laboratory equipment where this serum can be made at the minimum cost.

Additional diseases encountered are Foot and Mouth, Anthrax, Swine Fever, Surra, Rabies and others of a less infect-

ious nature.

The export of livestock to the Straits Settlements and the Malay States is considerable. In B. E. 2471 there were sent abroad 14,161 buffaloes, 25,186 cattle, 1,977 sheep and goats, and 70,140 pigs. All cattle and buffaloes were inspected prior to shipment, and certificates of health issued. In addition all buffaloes for export are vaccinated against Haemorrhagic Septicaemia before shipment.

The meat of cattle is inspected at the Bangkok Abattoir. During the year 2472 there were examined 22,235 carcases.

The past few years has been mainly for the Veterinary Service a period of preparation. Knowledge of the vagaries of the different diseases as met with in Siam has been promulgated, preventive measures for control have been established, and material for the protection of animal life has been tested and assessed. The position thus attained will permit of a very active campaign against disease in the future, conducted under much more favourable auspices than hitherto.

Saovabha Institute, Bangkok.

CHAPTER XVIII

SAOVABHA INSTITUTE

The Origin.

Previous to 1901, small-pox vaccine had to be imported, but the results were not wholly satisfactory because the vaccine deteriorated in the heat : it was impossible to depend upon it, for sometimes it was inefficacious.

H. M. King Chulalongkorn, being advised that small-pox vaccine should be manufactured in Siam, commanded the Minister of Public Instruction to make whatever arrangements were necessary in order that this vaccine might be prepared in the country. So the Minister of Public Instruction sent Dr. Adamsen and Nai Att to Manila to find out the process of making this vaccine When these two doctors had returned to Siam, headquarters for the making of the vaccine were established in Bangkok in 1901. Cattle were used for the purpose, but the vaccine thus made could not be considered first-class for the results were not always satisfactory.

In 1903 the headquarters for the making of the vaccine were transferred to Nagor Pathom, and the work was enlarged to include the manufacture of vaccines and sera for diseases of animals.

In 1910 the manufacture of the serum and vaccine was transferred from the Ministry of Public Instruction and placed under the Ministry of the Interior. At that time, buffaloes were substituted for oxen as the animals to be used in the manufacture. These animals have been used ever since, because it has been demonstrated that they are equally suitable and because they are easily procured in Siam.

In other countries where the knowledge of medicine has advanced, centres for Research work have been established. The Pasteur Institute of Paris is one such institution. But Siam had nothing of the sort. H. R. H. Prince Damrong, while still Minister

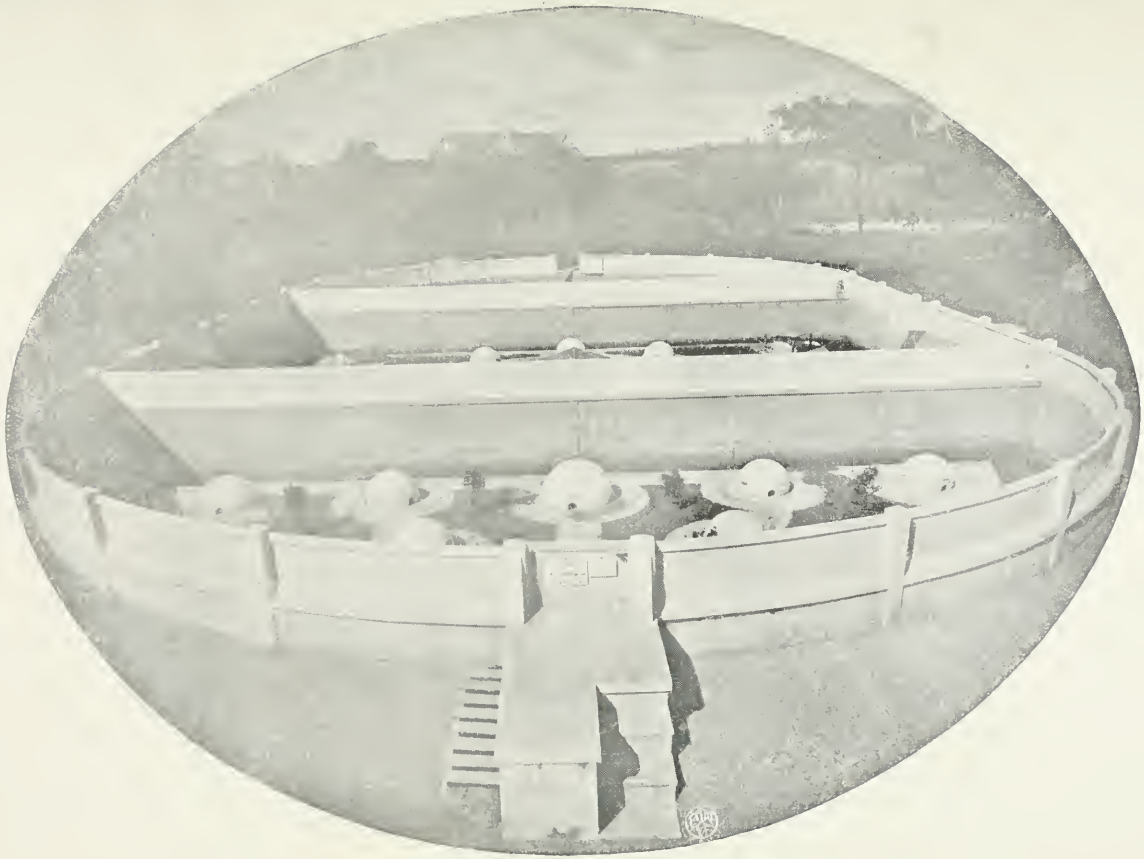
of the Interior, conceived the idea of establishing an institution for anti-rabic treatment and requested permission of H. M. King Chulalongkorn to undertake the work. Royal permission was given and the Pasteur Institute was found. This was the first enlargement of the original Laboratory, and the small-pox vaccine headquarters were retransferred to Bangkok and the whole brought together into one institution and opened on 26th April 1913. Later, in August 1917, the Siamese Red Cross Society took over this phase of the work, and this constitutes the Scientific Section of the Society.

On the occasion of the cremation of Her Late Majesty Queen Saovabha, 24th May 1920, His Majesty King Rama VI and those who wished to join him, gave money to the Red Cross to erect a memorial to his mother. This took the form of a building for the Pasteur Institute which is now known as Saovabha Institute. This was made a complementary institution to the Chulalongkorn. Hospital, which had been erected as a memorial to Her Royal husband. H. M. King Rama VI opened this second memorial institution on 7th December 1922.

The Snake Park.

In Siam there are dozens of varieties of poisonous snakes. In a single year these kill many people. No medicine has been found which will cure these snake bites except that made from the venom of the snakes themselves. When this serum was imported from abroad it was found not effective for all kinds of snakes in Siam. Therefore it seemed wise and needful to establish a place where the snakes could be kept and fed and the poison extracted and anti-toxic serum made. Dr. L. Robert, former Director of the Scientific Section, received donations from foreigners resident in Siam and with the money thus collected established a snake park. When it was completed, the Queen Aunt Swang Vadhana, the president of the Siamese Red Cross Society, opened it on 22nd November 1923. This is the second snake park in the world which has been established, the first being in Brazil.

Many people come daily to look at the snakes, and this is



Saovabha Institute: The Snake-Park.

a gain in two ways, viz:

People learn which are poisonous snakes.

People also learn that there is a new and efficacious remedy for snake bites, and they no longer use the useless remedies which are often prescribed for snake bites.

Aquarium and Collection of Insects and Reptiles.

A new building has been opened containing an aquarium and a collection of venomous insects and reptiles. The money came from the "Four Snakes" fund formed by two princes and two princesses born in the Snake Year (one of the twelve years of Siamese Astronomy).

The Work of the Institute.

The Scientific Section is divided into two main divisions, viz.,

1. Department of Human Medicine.
2. Department of Veterinary Medicine.

The Department of Human Medicine has the following work:—

(2) Prophylactic inoculation of anti-rabic vaccine. Inoculations were given to 7,063 patients from 1902 to 1929.

(2) Treatment of snake-bite with anti-venom serum; 3,058 cases were successfully treated from 1903 to 1929.

(3) Manufacture of small-pox vaccine for 2,000,000 people per annum.

(4) Manufacture of other vaccines and sera, viz., anti-cholera, typhoid, plague, gonococcus vaccines etc.; anti-venom and anti-dysentery sera, etc.

Over 400,000 doses of anti-cholera vaccine are prepared per year. A large quantity of anti-venom serum is also produced and distributed all over the country.

(5) Research work on pathogenic micro-organisms in view of diagnosis and treatment of diseases.

The Department of Veterinary Medicine has the following work:—

(1) Manufacture of various vaccines and sera for diseases of animals, e. g., a vaccine prophylactic for an epidemic disease of buffaloes, anthrax vaccine, anti-rabic vaccine, prophylactic vaccine

for epidemic diseases of pigs and hens, etc.; sera for treatment of epidemic diseases of buffaloes, anti-anthrax serum, etc.

Not less than 70,000 doses of prophylactic vaccine for epidemic disease of buffaloes are produced yearly.

(2) Research work on pathogenic micro-organisms in view of diagnosis and treatment of diseases of animals.

(3) Assisting the Veterinary Division of the Ministry of Lands and Agriculture by examination of pathogenic micro-organisms and diagnosis of diseases of animals throughout the country.

In the manufacture of vaccines and sera, prophylactic and therapeutic, both for men and animals, the Government has set up a Committee to superintend the production and distribution.

The Scientific Section of the Red Cross Society takes up research work in the pathology of human and animal diseases. The research work is stimulated to a certain extent by the two annual prizes, first and second, awarded through the Red Cross Society by the King and Queen respectively.

The Institute provides also practical courses in Microbiology for medical men and veterinarians.

Summary.

The Scientific Section of Siamese Red Cross Society has the following work in hand:—

1. Treatment of people bitten by mad dogs or snakes.

2. Manufacture of vaccines and sera for the prophylaxis or treatment of human and animal diseases.

3. Research on pathogenic bacteria with a view to obtain the etiology, diagnosis, prophylaxis or treatment of disease, human or animal.

4. Keeping of poisonous snakes to obtain their venoms for the manufacture of serum; keeping of animals employed in the manufacture of vaccines and sera, experiments and research work.

5. As a centre of research work for all medical men and veterinarians, who may make use of the apparatus, literature, chemical reagents, etc. provided.

6. As a centre of learning and practice in the medical sciences to medical men and veterinarians.

The Saovabha Institute: Research Laboratory.

The Saovabha Institute: Antivenin Production.

CHAPTER XIX

THE SIAMESE RED CROSS SOCIETY

The Establishment of the Society.

In B.E. 2436 (A.D. 1893), there arose a misunderstanding between the Siamese and the French Governments regarding the boundary line along the Mekhong River. As a result there was a certain amount of fighting between Siamese and French soldiers. Though the two governments were cognizant of the affair, open declaration of war was averted. Her Majesty the late Queen Mother Saovabha was very much concerned about soldiers wounded in that fighting and resolved that something must be done in order to mitigate their sufferings. Through her philanthropic and queenly appeal, members of the Royal Family, Aristocracy and Gentry of the country gave donations to form a voluntary aid society for rendering medical assistance to the sick and the wounded in the field. Medicine, food, clothing, etc. were sent to the sick and wounded soldiers through the charitable efforts of those ladies. That benevolent act so pleased His Majesty King Chulalongkorn that he consented to become its Patron and gave Royal command that the association should be named "Sabha Unalom Daeng" (The Red Unalom Society), but the name was afterwards changed to "Sabha Kajad Sayam" or the "Siamese Red Cross Society."

When peace prevailed the work of the Society ceased and subsequently members of the Committee passed away. Later the Society was placed under the control of the Ministry of War.

When His Majesty King Rama VI., then Crown Prince of Siam, was passing through Japan, he was so struck by the work and efficiency of the Red Cross hospitals in that country, that he determined to set up a permanent Red Cross hospital in Siam also.

After the lamentable death of His Majesty King Chulalongkorn, all of his sons and daughters, under the leadership of His

Majesty King Rama VI, expressed their wish to erect some permanent memorial to their August Father which would also be an honour to their Kingdom. The building up of a Red Cross hospital was readily agreed to and a sum of Baht 122,910 (Baht 11 = £ 1) was subscribed among them for that purpose. His Majesty King Rama VI was graciously pleased to give the land necessary for the building of this hospital which after completion was named the King Chulalongkorn Memorial Hospital.

Although Siam adhered to the agreement signed on 22nd August 1864 at Geneva and was represented at the Conferences in Geneva in 1906 and at Washington in 1912, the Siamese Red Cross Society was not then accepted as the National Red Cross Society until after its being put on the same basis as similar Red Cross Societies all over the world, by the promulgation of the Red Cross Act B. E. 2461 (A. D. 1918).

The Siamese Red Cross Society had full recognition of the International Red Cross Committee at Geneva on 27th May 1920 and adhered to the League of Red Cross Societies on 8th April 1921.

Its Object and Control.

The present object of the Siamese Red Cross Society, adhering to the principles of moral solidarity which unite all the National Red Cross Societies and in conformity with the Geneva Convention of 1906, is to care for the sick and wounded in time of war; to undertake, in time of peace, relief service in cases of public calamities or other disasters; to carry on such activities as relate to public health, to the prevention of diseases and to the alleviation of suffering, and to the organization of the Junior Red Cross Section.

The Siamese Red Cross Society has been very fortunate in having His Majesty the King as its Patron. Her Majesty the Queen has also graciously extended her exalted patronage to the Junior Red Cross.

The control of the Siamese Red Cross Society is vested in the President, the Vice-President and a Council consisting of twenty members. The President and the Vice-President are appointed by His Majesty the King. Every two years one half of the Councillors retire by rotation and are succeeded by new

Sukhumal Health Centre, Bangkok.

Councillors elected by the Council from among the members of the Society.

The Executive Committee of the Siamese Red Cross Society is composed of the Vice-President (Chairman), Secretary General, Assistant Secretary, Treasurer, Assistant Treasurer and Directors of Sections or branches of the Society, who are appointed by the President.

A general Council meeting is held once in six months and a meeting of the members of the Executive Committee is held monthly.

Members.

The members of the Society are divided into the following five classes :—

1. Special Members are those persons who are invited to join the Society by the Vice- President with the approval of the Council.

2. Honorary Members are those who, since the year B. E. 2457 (A. D. 1914), have given the Society in one single donation cash, or other property, to the value of not less than Baht 3,000.

3. Extraordinary Members are those persons who contribute not less than Baht 100 per year to the Society's funds. A life membership for this class is also granted for the subscription of a single sum of Baht 800.

4. Ordinary Members are persons paying a yearly subscription of not less than Baht 10. A life membership for this class is also granted for a single donation of Baht 150.

5. Popular Members are those persons who pay a yearly subscription of not less than one Baht, their membership lasting only for the year in which the said subscription has been paid.

The membership as at 31st March B. E. 2472 (A. D. 1930) comprised :—

Special Members	3
Honorary Members	169
Extraordinary Members	198
Ordinary Members	5,286
Popular Members	49,469
Total	55,125

Badges and Medals.

All members of the Siamese Red Cross Society are entitled to wear membership badges or brooches on the breast on all occasions, according to the classes to which they belong.

In order to mark the appreciation and gratefulness to donators who have so generously contributed to the Siamese Red Cross, or to those who have by their work helped to advance the cause of this charitable Society, three classes of Medals of Appreciation were created and are to be conferred upon those who have merited the esteem of the Society.

The Council of the Siamese Red Cross Society has also created Medals of Merit which are conferable on those who have rendered services to others, as defined in its by-laws, e.g., life-saving, and long service in the Society (15 years and over).

Up to date (1st July 1930) the number of Medals of Appreciation bestowed by the Society was as follows:—

1st class (Gold with enamel)	57
2nd class (Gold plated)	89
3rd class (Silver)	105
Total	251

and the number of Medals of Merit awarded was as follows:—

For long service in the Society	5
For life saving	109
Total	114

Resources.

Besides voluntary public subscriptions and donations, the Siamese Red Cross Society receives a subsidy to the sum of Baht 280,000 annually from the Government, without which the activities of the Society can hardly be carried on to such an extent.

The statement for the financial year ending March 1930 shows:—

Receipts	708,333.01 Baht
Expenditure	662,569.91 Baht

First Red Cross Reserve Call : Physicians and Nurses.

A Relief Station at Phra Buddhabaht.

Activities.

The activities of the Siamese Red Cross Society are conducted by five Sections, viz.:—

1. The Hospital Section
2. The Relief Section
3. The Health Section
4. The Scientific Section
5. The Junior Red Cross Section.

THE HOSPITAL SECTION.

The King Chulalongkorn Memorial Hospital is the principal activity of this Section and is supported by the Siamese Red Cross Society from its funds. Some Baht 300,000 are expended annually for this purpose. This Hospital, besides having numerous beds for those who desire to pay for special private rooms, has also some two hundred and forty charity beds for those who have no means to pay. In addition, many thousands of people are treated in the out-patient Department; maternity cases are cared for at homes and other assistance rendered to the community. A fuller detail of this Section is specially described elsewhere.

THE RELIEF SECTION.

The object of this Section as its name implies, is to bring relief in time of war and peace to needy communities regardless of nationality. It endeavours also to teach and train men and women in nursing and the care of sick, thus creating a reserve of nurses for service in time of war or in the event of public calamities.

The headquarters of the Relief Section is located at the King Chulalongkorn Memorial Hospital.

The activities are divided as follows:—

1. The Relief Division in Time of Peace contributed to the public safety by sending first-aid ambulances on such occasions as community fairs, race meetings, conflagrations and other similar events.

2. The Relief Division in Time of War has had no occasion

to participate in active service, but is organized in such a manner that should occasion arise, it will be able to fulfil its duties.

One of the main objects of the Society is the training of nurses as an important factor in administering relief in time of war as well as in time of peace. The course of training covers three and a half years. After graduation from the nursing school, the nurses may be employed in the Red Cross hospital, but those desiring other service, are free in their choice of occupation, except that they are expected to hold themselves in readiness to meet the call of the Society.

THE HEALTH SECTION.

This Section was organized in 1921 in order to carry out a country-wide survey of the Hookworm disease in co-operation with the International Health Division of the Rockefeller Foundation. The staff of the survey units conducted also an educational programme as a part of the sanitary campaign. This work was transferred to the Department of Public Health in 1923.

As soon as the Siamese Red Cross Society joined the League of Red Cross Societies, the latter's peace time programme has been adopted by the Society. Both Public Health Nursing and Popular Health Instruction were initiated since 1923.

Anti-leprosy work was started at about the same time in order to asist the Government to cope with one of the major health problems of this country.

At present the Health Section is composed of the Public Health Nursing, the School Health and the Anti-Leprosy Divisions.

PUBLIC HEALTH NURSING DIVISION. The work of Public Health nurses in this country has proved to be of value and indispensable in promoting maternity and child welfare and health habits of the families. A few nurses who were trained abroad were called upon to initiate the work. No doubt, these pioneers had to face a difficult task, to work, in some instances, against traditions and prejudice; but their earnestness and good will won the confidence of the public in a short time. Groups of three to five

Child Welfare : Fostering the Personal Hygiene.

School Nursing : A First Aid Class.

young women working for the common welfare of the people, is indeed a courageous deed and worth recognition.

The first Health Centre was established in 1923 at Plabplajai Road in Bangkok. The centre was equipped on modern lines. The activities were of a generalized programme. The public, uncognizant of the preventive aspect of the work, crowded the centre with all kinds of complaints; the contact made in this way proved to be beneficial in accomplishing the final aim of health education and supervision.

Expectant mothers are encouraged to attend prenatal clinics; midwifery is done by the nurses to emphasize the new way of attending a child's birth; advice and demonstrations are given in the homes; layettes and other articles for mother and child are exhibited in the Centres. Anti-tuberculosis work is carried out on a limited scale, to prevent mass infection which would endanger exposed infants. Bedside-care is usually given in child's illness in view of educating the family in Home Nursing and Hygiene. The Centres also serve as clinics for school children. The nurses are often called upon to render first aid and to make arrangements for medical care in the case of serious illness.

There are nine Red Cross Health Centres scattered in different parts of the country, running on the same lines: three centres are in Bangkok, one in the North, three in the Eastern Provinces and the other two in the Southern Provinces. In construction the Health Centres were at first tenements and private residents adapted for the purpose. Now most of them are specially built and donated by certain benefactors or secured by public subscriptions.

The School of Public Health Nursing was established in 1925. The course is six months. The students are nursing and midwifery graduates. This school also trains Public Health nurses for the Department of Public Health.

The progress of this Division may be gauged by the following data :—

Items	1923	1924	1925	1926	1927	1928	1929
Health Centres	2	3	4	6	7	8	9
P. H. Nurses	6	13	21	29	38	41	43
Nurses taken Course ..	—	8	8	8	15	15	—
Child attendance	2,026	4,946	11,119	13,636	21,964	28,574	35,956
Adult attendance	2,661	8,862	19,203	28,328	36,021	62,243	78,330
Dental cases	188	1,145	2,327	3,646	9,446	15,468	15,842
Minor surg. cases	7,734	18,397	31,478	51,439	75,802	87,330	94,561
Home visits	3,336	8,570	15,729	15,925	22,142	23,952	18,902
Mat. deliveries	5	25	132	222	457	515	719
Prescriptions issued ..	1,562	4,760	10,522	20,003	23,117	46,913	62,625

SCHOOL HEALTH DIVISION. This Division works in co-operation with the School Health Service of the Ministry of Public Instruction. Full account of the activity may be found in the chapter on School Health Service.

ANTI-LEPROSY DIVISION. The aim of this Division is to ascertain and to treat such incipient cases of leprosy as may become non-infective. This is accomplished partly by the establishment of a Leper Clinic in Bangkok. The more advanced cases are segregated and treated in the Leper Asylum at Phra Pradaeng, in the vicinity of Bangkok.

Over one thousand lepers pass the Red Cross Leper Clinic each year. All of them get regular treatment as well as some instruction how to take care of themselves and to protect others from the infection, especially young children. Attempts are also made to examine from time to time those who live in the same house with the lepers. The result of treatment with ethyl esters of Chaulmoogra oil, prepared from the seeds of local *Hydnocarpus anthelmintica* by the Government Laboratory, is hopeful in many cases. A short description of the chief features of the Red Cross Leper Asylum at Phra Pradaeng is given in the chapter on Leprosy in Siam.

Juniors singing and dancing before Their Majesties
the King and Queen.

THE SCIENTIFIC SECTION.

The Scientific Section is installed in the Saovabha Institute and its work is of the same nature as that of Pasteur Institutes, that is to say it comprises laboratories both for analysis and research work, a library and special buildings for anti-rabic work and preparation of sera. A fuller detail of this Section is specially described somewhere else.

THE JUNIOR RED CROSS SECTION.

The Junior Red Cross Section was organized for the purpose of inculcating in the children of the country, the ideal and practice of service, especially in relation to the care of their own health and that of others, the understanding and acceptance of civil responsibility and the cultivation and maintenance of a spirit of friendly helpfulness towards their own nation and all other nations of the world. The work of this Section was carried out with such satisfactory results that 14 Chapters (circles), 78 Divisions (Provinces), 380 Groups (Districts) and 1,754 Units (Schools) were established; in all 58,243 (37,614 boys and 20,629 girls) Junior members being enrolled.

The Ministry of the Interior has given its full and whole hearted support to the movement and officials of the Ministry of Public Instruction are important factors in the organization.

Scholars between the ages of 7 and 17 are eligible to become Junior members, provided they agree to accept the objects and resolutions and wear a special insignia of the Red Cross.

CHAPTER XX

PROTESTANT MEDICAL MISSIONS

Missionary medical work has very often been considered as a means to an end—the end being the conversion of the people to Christianity. But this is a very narrow view of the situation. It is more correct to say that when the Spirit of Jesus Christ grips a man, he cannot help but "go about doing good" like his Master. This means that he will meet every call of need, no matter where it may come from and what form it may take. He is forced by an inner urge to attempt to meet all needs, physical, mental and spiritual.

This explains why many of the early protestant missionaries, not trained in medicine and surgery, gave of their time and strength in doing their best to alleviate human suffering in Siam. This explains why to this day in the interior districts all missionaries are addressed as "doctor". The confidence which their love and sympathetic helpfulness had inspired was no small factor in wooing the ignorant away from their witch-doctors and incantations to a realization of the true worth of modern medicine and sanitation. Outstanding among such men have been the Reverend Doctors McGilvary in North Siam and Eugene P. Dunlap in South Siam, both evangelists who were throughout their lives known as "doctor".

The first Protestant missionary to Siam was a Doctor of Medicine, C. F. A. Gutzlaff, who arrived in 1828. His ill health and the early death of his wife caused him to retire after three years of service. His successor was Dan Beach Bradley, M. D., who arrived in 1835 and gave nearly forty years of his life to Siam in the ministry of healing.

It is difficult for us today to imagine the conditions under which these early pioneers had to labor. Their equipment was most meager. Only the crudest of clinical thermometers were

available and the hypodermic syringe was then unknown. The X-ray and other modern means of diagnosis and treatment, of course, had not yet come to play the part they do to-day. Probably the first surgical operation under ether anaesthesia in Asia—certainly in Siam—was performed by Dr. House, the "Man of the Gentle Heart" who came out in 1847. Then ether had been used in surgery for but two years.

In 1840 Dr. Bradley introduced vaccination into Siam, having brought the virus on the long nine months voyage by sailing ship Before long scabs from vaccinations were carried by Dr. McGilvary on the twelve weeks boat journey to Chiengmai and thence throughout North Siam, and by other missionaries throughout the southern part of the country. Before many years sufficient virus was being made by Dr. Braddock in Bangkok and by Dr. McKean in Chiengmai to make possible the wholesale vaccination of the masses. It was largely due to their efforts that this ancient scourge of the Siamese people was conquered. The laboratory for the production of vaccine which Dr. McKean established in 1904 met a real need, in view of the extreme difficulty in securing fresh vaccine from abroad. Throughout a period of ten years a high grade vaccine was thus produced in large quantities and broadcast over the northern provinces by the hands of the mission vaccinators, who at one time numbered as many as 210. Vaccine was also supplied to other Mission hospitals and to the Government up until the promulgation of the Compulsory Vaccination Law and the establishment of the Pasteur Institute made the continuance of this laboratory unnecessary.

During the past century of Protestant Missions in Siam 43 different missionary doctors have given a total of 559 years of service to this country. This does not include the contribution which many others with missionary connections have made in the direct service of the Siamese Government. Such men as Dr. T. Heyward Hays, Dr. W. B. Toy, Dr. George B. McFarland, with a distinct missionary background, have rendered invaluable service to the Siamese Government.

In addition to the General Hospitals which have been esta-

blished at such centres as Bangkok, Petchaburi, Rajburi, Nagor Pathom, Nagor Sridharmaraj, Trang, Bisnulok, Chiengmai, Chiengrai, Prae, Nan, and Lampang, special mention should be made of certain special forms of work which have been undertaken in different parts of the country.

Special articles will deal with the Leper Asylum and the McCormick Hospital at Chiengmai, and Dr. E. B. McDaniel's Leper Home at Nagor Sridharmaraj, so these will be omitted from this description.

At Nagor Pathom Mr. and Mrs. Clark have a growing maternity work. From the first the aim has been to reach the poorest classes. Since these people have been largely influenced by the old ideas of their ancestors and are least ready to accept the modern methods, an honest attempt has been made to preserve as many of the hereditary customs as possible, merely insisting upon proper cleanliness. In this way many more have been helped than would be possible if all cases had to be handled in a strictly modern way.

In Bangkok a Maternity Home was established in 1922. It started in a small way, but has maintained a steady growth. Pre-natal care of the mother has been an advance step to which many Siamese women have responded. The Mission Health Centre and Clinic is just in its infancy, but bids fair to becoming a very important asset in meeting the health needs of this large city.

The Training School for Nurses in Chiengmai should be mentioned, although it will receive special mention in the article on the McCormick Hospital at Chiengmai with which it is associated.

In these and other more obscure ways the Missionary forces are trying to assist the Government in answering the call of real need which rises on all sides as one goes up and down the length and breadth of this land. A more complete record may be found in the Centenary Volume "Historical Sketch of Protestant Missions in Siam—1828-1928."

CHAPTER XXI

THE MEDICAL ASSOCIATION OF SIAM

Although the Royal Medical College had its inception in 1889, it was not until 1921 that the trained physicians of Siam banded themselves together into a Medical Association. By that time the number of medical men trained in the use of modern methods had become large enough to make themselves felt in Siam. They not only become conscious of themselves as a definite group in the country, but they also began to realize there were definite problems facing them which they could successfully meet only as an organized body. A number of the leading physicians of Bangkok therefore met at Chulalongkorn Hospital on September 13th and again on September 27th, 1921, to consider the advisability of organizing a Medical Society for Siam. Those present at one or both of the meetings were :—

Mom Chao Thavara Mongolwongse
Phya Vipul Ayuraved
Phya Damrong Baedyagun
Luang Ayurabaedya Bisesh
Phra Abbhantrabadh Bisal
Luang Vaidyesarangkura
Dr. M. E. Barnes
Phya Vejasidhi Bilas
Mom Chao Vallabhakara
Dr. Leopold Robert

At the second meeting a Constitution of the Association was unanimously accepted, and officers were elected from the charter members as follows :—

President—Mom Chao Thavara Mongolwongse
Secretary—Phya Damrong Baedyagun
Treasurer—Luang Vaidyesarangkura

Four additional persons were elected to serve with the officers

as an Executive Council, viz:—

Phya Vipul Ayuraved
Dr. Leopold Robert
Phya Vejasidhi Bilas
Dr. M. E. Barnes

In order that the scheme might first be laid before H. R. H. the Prince of Nagor Svarga, Managing Vice- President of the Siamese Red Cross Society, final organization was not effected until October 12th. His Royal Highness heartily approved the plan, consented to name the Association, and agreed that Chulalongkorn Hospital be its temporary headquarters, with members of the staff helping with the clerical work. The Medical Association of Siam was thus duly started on October 12th, 1921, and registered according to law on the 25th of the same month.

Purposes of the Association.—The purposes underlying the new organization were four-fold: First, to improve the standing of medical practitioners in Siam. The many classes of persons practicing medicine necessitated a separation of qualified men from the unqualified. All medical men qualified in Siam or abroad were urged to join the Association and uphold its standing.

Second, to increase the medical knowledge of these practitioners.

Third, to encourage friendship and a spirit of co-operation among the members.

Fourth, to co-operate with Government Departments in their activities respecting sanitation and the prevention of disease.

Members.—Upon recommendation by a member and endorsement by a second member, any physician graduated from a medical school of good standing is eligible to membership in the Medical Association. The Executive Council is authorized to pass on the credentials of the applicants. Any member convicted of criminal offense or who behaves himself so as to bring discredit upon the Medical profession or the Medical Association, may be dropped from membership by a two-thirds vote of the members present at an Executive Council meeting. Such a member is not eligible to re-election to membership and forfeits all right to the

benefits of the Association and to the finances thereof. At present the Association has 377 members.

The Executive Council.—This Council is composed of nine members: the President, Secretary, Treasurer and six others. The Council is elected from the membership of the Association and members retire in rotation after three years; all are eligible to re-election except the President who retires to the position of Honorary Adviser. The Council elects the President, Secretary and Treasurer from its own members.

The chief duty of the Executive Council is to direct the affairs of the Association during the interval between general meetings. It also adds by-laws as needed, appoints committees, fills all vacancies, and sanctions payment from the funds of the Association. Five members constitute a quorum.

Meetings.—Monthly meetings of the Association are held at which papers on various medical subjects are read by members. Annually a General Meeting is held at which the activities of the year are reported to the Association, members are elected to fill vacancies on the Executive Council and general business is transacted. Lectures on medical subjects are delivered and discussed.

Seal.—The seal of the Medical Association bears a three-pointed spear and the Naga, which represent the god Indra who is the god of the Medical fraternity. He carries the curiously shaped spear and winds the Naga round his body. The name of the Association forms the border of the seal.

Finances.—The Medical Association is financed by the annual fee of Tcs. 10.00 (a little less than £1) paid by each member and by receipts from the Journal. At present the Association has a credit balance of Tcs. 8,808.41.

Accomplishments.—As the purposes of the Association were mentioned as four, the achievements may be given under the same heads.

First. The improvement of the standing of practitioners. The Medical Association feels that it played at least a modest part in securing the recent Medical Law. By stressing the need of investigating the credentials of practitioners; by example in

the matter of supporting physicians who are well qualified to carry on medical practice; by using its influence to bring to punishment those who have violated rules governing the medical fraternity or who have acted to the detriment of the public, the Association created a sentiment that helped to bring to the notice of those in authority the need for better medical laws. The present Medical Law is a long step in this direction. By this law, only properly certified men are allowed unrestricted practice in the city of Bangkok. The law is later to be extended to the provinces.

SECOND. The improvement of the knowledge of physicians. For this purpose the monthly meetings are held. In addition there is published a Medical Journal which gives much information for the help of practitioners.

THIRD. Friendship and co-operation among medical men. This has been apparent to all who have been connected with the organization.

FOURTH. Affiliation with Government Departments. The Association has been honoured by having a representative on the Medical Council that administers the Medical Law.

CHAPTER XXII

NURSING IN SIAM

The work of the nurse is inspired by the desire of woman to alleviate human suffering and to prevent it if possible. Those who join the service throughout the world are all pledged to this common ideal, to the exclusion of all self-gains.

It is very long ago since Miss Florence Nightingale, the beacon light of modern nursing, sent out her Pledge, yet it still beats in the heart of every nurse. It runs:—

"I solemnly pledge myself before God and in the pre-
"sence of this assembly:

"To pass my life in purity and to practise my profession
"faithfully;

"I will abstain from whatever is deleterious and mischievous,
"and will not take or knowingly administer any harmful drug;

"I will do all in my power to elevate the standard of my
"profession and will hold in confidence all personal matters com-
"mitted to my keeping and all family affairs coming to my
"knowledge in the practice of my calling;

"With loyalty I will endeavour to aid the physician in his
"work and devote myself to the welfare of those committed to
"my care."

The Nursing Profession of Siam comprises:—

1) The graduates of the School of Midwifery and Nursing which is affiliated to the Faculty of Medicine of Chulalongkorn University, working in co-operation with the Rockefeller Foundation;

2) The graduates of the Training School for Nurses and Midwives of the Siamese Red Cross Society, which trains personnel in peace time as a preparation for possible war-time work.

In the whole body of the Nursing profession of Siam there are not more than 500 members; but they are all fully trained

midwives and nurses, enjoying the recognition of the Government under the Medical Act. This Act controls as well as encourages their humanitarian work. The great force of public opinion standing behind the Nursing profession supports its work because it aims at giving the finest and most unselfish service to humanity.

The Nurses' Association of Siam is an independent institution, whose essential characteristic is fostering the spirit of practical co-operation and mutual assistance. It is this Association which is entrusted with the maintenance of the high standard of Nursing in Siam.

The Beginnings of the Movement for Training Midwives.

The old-style midwife is in some cases a woman who has been a successful mother; and sometimes she is a woman who has passed middle age and, finding the cares of her household falling on other shoulders, tries to help her neighbours and friends in their time of labour, coming in this way to take up the work of a midwife regularly. She has had no training; she knows nothing about Anatomy or cleanliness, and is full of superstition. She makes the patient sit up against a red water jar; herself sits before her holding up her finger and keeps repeating "Presently the pressing wind will come" (meaning the contraction of the uterus). This posture in delivery dates back thousands of years, as is shown by the engraving at Bayon (Angkor Wat). Among the many engravings there depicting ceremonies there is one showing the water jar with a woman sitting against it and another sitting before her holding up a finger. This was the method adopted in Siam from the oldest times.

Even now there are many old-style midwives in practice all over Siam. But of late years, since the Medical Law came into force, the State has begun to control them by registration. In 1857 A. D. the American Missionaries tried to better the existing state of things by taking a young girl in one of their schools, named Esther to America to be properly trained as a midwife. When she came back she began to practise her profession and continued to do so all her life among the high class of Siamese and Europeans. She died this year (1930), aged 85.

Esther was the first trained midwife among the Siamese. She had a wide practice, and could be said to be the only midwife with modern training in service among the upper class until old age compelled her to give up work some 20 years ago.

Her Majesty Queen Saovabha (the Queen Mother) was the first lady in the land to take definite action on realizing the high mortality rate in maternity cases through untrained midwives. She asked His Majesty King Chulalongkorn to send four girls, aged 10 to 11 years, to England to be trained as midwives in 1883. They went with Prince Narес and returned in 1894 with Miss B. A. Smith, who was brought out to teach in Sunandalaya School for girls. They had not been able to enter the training school for midwives, as they could not be admitted till they reached the age of 25. At the time they finished their ordinary school training in England, Siam had begun to feel the pressing need for organizing education for girls here; and so they were brought back to assist Miss Smith at Sunandalaya. The failure of this first attempt did not daunt the Queen; she still persisted in her idea. The Midwifery School financed by Her Majesty was then opened on 12th January 1897 under the Education Department at Siriraj Hospital as an affiliate to the Medical School. There were six beds in the lying-in ward. The late Lady Bhaskarawongs, wife of the then Minister of Public Instruction, was Directress; and the late Dr. H. Adamsen was instructor. The late Dr. Hays, the late Dr. Tien Hee (Phya Surasin) and Dr. Geo. B. McFarland (Phra Aeh) also taught in the School. There was a three years course, two of study and one of practical work. Fourteen married women were enrolled as the first students and of these ten passed the final examinations at the end of 1900. On the 3rd January 1901 Their Majesties the King and Queen went to present the successful students with their diplomas and prizes. It was on this occasion that His Majesty opened the permanent home of the Medical School at Siriraj Hospital. For the next three years the Midwifery School was moved to the residence of the late Lady Khun Ying Pan (now the Seuksa Nari Girls' school of Thonburi) from Siriraj Hospital. In

the following year the School found its home in the residence of the late Chao Phya Bhaskarawongs (now the west bank office of the Royal Irrigation Department). There was no hospital attached at either of these places, so the students were sent to get clinical experience in the different hospitals of the city existing at the time, including the Burabha Hospital and the Nursing Home. After that they were sent out to practise among the public with no final examination or certificate. The School was given up in March 1905.

In 1908 the Education Department re-opened the Midwifery School and attached it to Siriraj Hospital, the Queen Mother continuing her support by financing the School. A matronly woman was put at the head to look after the students and their home. The home was on the top floor of the Saovabhak building. This building was one of the pair built at the start of the hospital; the other, the Victoria Ward, was built with the funds collected among foreigners on the occasion of Queen Victoria's first Jubilee, and was used as the residence of the house-physician. The age limits of nurse students on admission were from 15 to 25 years and they were required to have passed the third year examination of the Elementary Schools or its equivalent. The general plan of instruction was mainly confined to midwifery, general nursing not being much touched on. The Nurses' Training School of the Red Cross Society began in 1914 by giving a training in general nursing only, sending its graduates to the Queen Mother's School of Midwifery to be trained as midwives. It was in 1922 that the Red Cross began to train midwives as another branch of its activities.

The number of fully trained midwives up to date is 398. The Midwifery School was re-organized in 1926 with the co-operation of the Rockefeller Foundation but the running expenses of the School are still financed out of the Queen Mother's fund, a bequest made by Her Majesty before her death. The School now gives training in general nursing and midwifery, the course being 3½ years. The age limits for admission have been fixed at 16 to 30 years, and before entering the student is now required to have passed

the 6th year examination of the Secondary Schools. The facilities for instruction include a well equipped demonstration room. The Siriraj Hospital which provides clinical experience has a capacity for about 300 patients. The services include medicine, surgery, obstetrics, pediatrics, gynaecology, dietetics, out-patient department and other special services. The School has made satisfactory progress. Students are chosen to be sent abroad to Manila and America for further training at the expense of the Rockefeller Foundation.

The new home of the nursing students was formerly the Wang Lang Girls' School of the American Mission. This spacious home was secured by the kindness of His late Royal Highness Prince Mahidol of Songkhla.

The Training of Nurses.

In olden days in the homes of the people the nursing required was undertaken by the relatives and friends of the patients—men nursing male patients, and women nursing female patients. Such nurses had no proper training, and none of them could pretend to efficiency. A doctor often found, not one relative, but the whole family acting as nurse to the patient, with the sick room closed up to keep out wind and sun, cluttered up with kitchen utensils and often over-crowded. In critical cases such conditions caused unrest and confusion. This kind of nursing still exists, but modern methods have made a great advance, conditions being now more satisfactory than of old.

Since Bangkok became the capital of Siam the country has been visited by several severe epidemics of small-pox, cholera, plague and influenza. In such cases the earlier Kings of the Dynasty used to have temporary hospitals erected as centres to dispense medicine and to give nursing care to the people afflicted, only male attendants being employed. After each epidemic these hospitals were dismantled. That was the custom. The last occasion on which temporary hospitals were built was in 1882, when there was a severe epidemic of cholera and 48 hospitals had to be arranged to cope with the outbreak. This made His Majesty King Chulalongkorn see the advisability of building permanent hospitals. A Committee of nine to manage the first permanent

hospital was appointed in 1887.

This Committee chose Wang Lang Palace as the site of this first hospital. Subscriptions were invited to defray the cost of the building; and the foreign residents helped by presenting the Victoria Ward as a memorial of Queen Victoria's Jubilee. Somdej Chao Fa Siriraj, a son of King Chulalongkorn, had died and in 1888 the crematorium for the disposal of that Prince's remains was erected near the Hospital, which thereby came to be called after the boy Prince. The Siriraj Hospital was opened to the public on the 26th April 1888, under His late Royal Highness Prince Sri Saovabhang as director of the newly formed Hospital Department. After the first start other Government hospitals were established such as the Burabha Hospital, the Debsirindra Hospital, the Lunatic Asylum, the Bangrak Hospital, etc. There were besides several privately owned hospitals, subsidised by the Government. The first Committee put forward the idea of training doctors solely for the hospital, but the idea did not materialize until 1889 when a medical school was started in Siriraj Hospital. This School had two branches, the European or modern and the Siamese or old-style. In the former the teaching was given by doctors with foreign degrees, and these included: 1. Dr. P. Gowan, who also looked after patients outside the hospital; 2. Dr. T. Heyward Hays; 3. Dr. Geo. B. McFarland, also the resident physician of the hospital; 4 Dr. Hans Adamsen; and 5. the late Phya Sarasin (Dr. Tien-Hee, M. D., America). Siamese medicine was taught by H. H. Prince Chiuk Tinakorn. There were also two lying-in wards, one following modern methods, and the other in which the mothers were made to lie before a fire, being conducted on old Siamese lines. The nursing in Siriraj and all the other hospitals, was all done by men servants for the men patients and women servants for the women patients. In 1893 when the Siamese Red Cross Society was first started, Siam had a difference with the French. The sick and wounded army men were tended by the Red Cross officials at various places arranged as Red Cross Hospitals. The biggest of these was in Wat Mahadhadu. The nurses were all men; and the

Red Cross Nurses' Training School.

Siriraj Hospital : Nurses' Dormitory.

lady members of the Red Cross Committee acted as supervisers—visiting the patients, looking into the management of the hospital, and helping to get in supplies; they did not do any nursing work.

The Siamese Red Cross Society was the first to begin the real work of training nurses in Siam. The Nurses' School was started in 1914, the year the Chulalongkorn Hospital was first opened. The School was attached to that Hospital, and housed in the Sudhadibya Building built by the late Chao Fa Krom Luang Sri Ratana Kosindr, sister of H. R. H. the Prince of Nagor Svarga. It is one of the four buildings in the Nurses' Home. The School began with three graduates of the Midwifery School and four other girls. By the end of the first year twenty-six girls were enrolled in the School. In the first instance the course of instruction was to cover only one year. This was later on increased to two years and now $3\frac{1}{2}$ years of training are required. The age limits of the students is from 17 to 30. The admission standard was at first the 3rd Elementary Standard but now it is the 6th Secondary. The facilities for instruction include the Chulalongkorn Hospital, a demonstration room for instruction in the principles and practice of Nursing and Midwifery, and ample class room facilities, while a library for text-books and books of reference has been provided in the Nurses' Home. The general library is also open to students in the School of Nursing.

The Chulalongkorn Hospital, which has about 400 beds, provides the clinic experience including medicine, surgery, pediatrics —an orphanage is also attached—obstetrics and gynaecology, urology, otolarynology, ophtalmology, dermatology, neurology, and dentistry. Observation and assistance at the out-patient clinics comprise an important part of the case experience of each student.

Before there were any hospitals, sick people were treated at home or wherever they could find care. Long after the first hospital was opened, anyone going there was looked upon as being in desperate straits with no relatives to care for him. It was assumed he had to go to hospital to die. For a woman

dangerously ill, a hospital was still more impossible. The hospital had a very bad name. But since the opening of the Red Cross Society hospital, royalty and nobles have been among the in-patients and have thereby set a good example to the people. Indeed the old belief is changed and now several thousands of people come for treatment at the Hospital yearly.

The work of training women nurses was at first very difficult, because to use unmarried women to care for sick persons who were not their relatives was thought to be improper. In any case according to the old idea women should nurse women, and men should nurse men. As a result of this belief together with the wrong idea about a hospital, the people did not properly support nursing, which was left largely to the ignorant. But since the Red Cross Hospital came into existence, parents and guardians have seen the advantages that girls gain by becoming trained nurses, and each succeeding year more have come to study.

The number of fully trained nurses up-to-date is 405. The number of Siamese nurses is small when compared proportionately with the number in other nations, that being due to the fact that the manners and customs of the Siamese are different from the manners and customs of European countries. In Siam the women confine themselves to the duties of the home, and have nothing to do with the opposite sex unless they be members of their own family. The Red Cross Society did try with success to combat this custom, and now we see young girls of good family enrolled in the Nurses' Schools.

The 1916 the Red Cross made its first experiments in giving female nurses the charge of male patients. This was tried during day time only, but it failed because Siamese girls were so extremely bashful and timid in the presence of men that they were unable to carry the grave responsibility.

In 1918 the experiment was repeated with success. The parents and guardians of girls had been gradually changing their mode of training their children and protégées, in giving them more freedom in society and fuller social life in the home, in accordance with the spirit of the age. The senior nurses have for some

years assumed the duties of sisters in complete charge of male wards, carrying out the physician's instructions in important cases with full responsibility. Non-resident male patients are also attended by female nurses, while all nurses can do night duty in male wards.

The Queen Mother's Midwifery School began affiliation in 1916 by sending second year student midwives to study and practise nursing in the Red Cross Nurses' Training School. This was continued till 1926 when the Red Cross required a three years course in training nurses.

The training of male nurses was started by Siriraj Hospital in 1906. After a one year course eight passed the examinations and were given certificates. These male nurses were trained with the sole idea of working in the hospital. This project was given up altogether in 1925. The Red Cross Society also trained male nurses to become part of the Red Cross Hospital staff. This plan too had to be changed, as it entailed great expense to the Red Cross Society and in time of emergency the Red Cross Society had no power to call them up in case they did not volunteer. The Red Cross Society came to an agreement with the Ministry of War to loan conscripts to the Red Cross Hospital when the men could complete their training as nurses in two years. Seven conscripts were at first sent annually to the Nursing School; and this number was later increased to forty annually. After two years training, the men are placed on the reserve and the Red Cross can call them up through the Army in case of emergency. The work of training male nurses in this way still goes on and about three hundred conscripts have now been trained.

The plan of the Red Cross Nurses' Training School in giving a 3½ years course is to develop in the student the greatest possible practical efficiency and skill in the nursing care of patients and to provide her with scientific training and knowledge of the theory underlying the treatment of disease. This it is hoped will make her ministrations interesting and educationally profitable, besides giving her a firm and intelligent foundation upon which to base

subsequent specialization in any form of nursing work. The students who have passed their final examination are enrolled in the Red Cross Volunteer Corps for the term of five years and are subject to emergency calls.

Those who have finished their training, can still continue on special work in the School as follows:

1. Medical Nursing,
2. Surgical Nursing,
3. Obstetrical and Gynaecological Nursing and Child Welfare.

Up-to-date eighteen have passed the examination in the third subject. None have passed in the first or second subjects. This post-graduate work was started in 1922.

The Red Cross Society also sends young women to be trained abroad, to Manila, and to England in particular. The Nurses are sent for post-graduate study at Bedford College for Women, University of London, under the direction of the League of the Red Cross Societies. They take up various branches of study such as Public Health Nursing, Nursing Administration and Teaching in Schools of Nursing. Three have finished the course in Public Health Nursing and one is still there studying Administration and Teaching.

The Red Cross Nurses' Training School, in the short period since its establishment, has made satisfactory progress. Through the combined efforts of the hospital staff and the administration, the best modern methods for the care of patients have been adopted, and the facilities and equipment required have been generously provided. The instruction given in the classroom is good, and everything that can be desired in the way of library facilities is available. Students come from families that may be described as of the better class and of good financial standing. Their education now generally goes up to the 8th Secondary Standard.

The Red Cross Society here also provides a post-graduate course in Public Health Nursing. As regards Public Health Nursing competent nurses were first sent out to help patients in

their homes, and also to give prenatal and post-natal assistance as well as to do child-welfare work. The effort was so successful that it was decided to start a school for training Public Health nurses in Bangkok. The Public Health Nurses' Training School began its work in 1924 with a six months course. There were eight graduates of the Red Cross Nurses' Training School and of the Queen Mother's School of Midwifery to start with, and up-to-date 45 nurses have completed the course and are fully qualified. The Government Department of Public Health also sends its nurses to affiliate with this school.

The third Training School for nurses in Siam was established in 1924 in connection with the McCormick Hospital in Chiengmai. This is one of the American Missionary hospitals with a capacity of 86 beds. The first school outside Bangkok, it has made good progress. It takes the Red Cross curriculum and goes in for the Red Cross Nurses' Certificate. Up-to-date six have already passed the Red Cross final examination. The qualification for admission is the 6th Secondary standard, the aim of the School being to train nurses to help in the different hospitals of the Mission. This is an important and a big work, for the aim of the Mission is to promote the welfare of the people all over Siam.

In 1927 the Red Cross Society undertook to allow the McCormick Training School students to work at the Red Cross Health Centre at Chiengmai, for six weeks. This may lead to their joining this branch of the nursing work after graduation. The school has grown in equipment and personnel in a way that promises well for its future. Then there is a Maternity Home in Bangkok run by this Mission. It was started in 1922: and graduates of the Bangkok Bible Training School are accepted as students for a course in midwifery to help them in their evangelistic work later on. The Home has made steady progress along the lines of prenatal care and health work.

Most of the American Missionary hospitals, as well as the hospital and dispensary run by the Churches of Christ Mission at Nagor Pathom, now train their own staff. With the help of the doctors' wives the maternity and child welfare of the different

stations is being carried out with a considerable measure of success. But all these may change to still better conditions in the near future; as the number of graduated nurses increases, skilful service may be made available to all.

The Nurses' Association of Siam.

The Nurses' Association of Siam was established on 1st April, 1927, by the senior nurses and midwives of that time with the help and advice of Major-General Phya Damrong Baedyagun. It was he who first thought of training nurses for the Red Cross of Siam, and who successfully developed the idea, the centre then established becoming the first training school for nurses in the country. When it was decided to form the Association the Red Cross Society gave help from the start, providing a meeting place and the clerks to do the necessary clerical work. His Royal Highness Prince Paribatra of Nagor Svarga, the Vice-President of the Red Cross Society, attended the first General Meeting of the members on the opening day, which took place on the 21st May 1927, at Chulalongkorn Hospital.

The number of nurses and midwives in Siam at the present moment has already reached several hundreds. In the case of those who have long left behind their training-school days, and who have now no communication with any hospital, their knowledge of the principles and art of nursing must tend to deteriorate; and it is important that they should try to keep themselves up-to-date with the progress that nursing is always making. That is all the more true of those who after training have gone back to their own homes, and do not follow the nursing profession as a means of livelihood. As these classes increase, they must tend to lower the general standing of the nurses of the country. It was to guard against this natural tendency that the Nurses' Association was established with following aims:—

To foster the spirit of comradeship and goodwill;

To furnish opportunities for an exchange of knowledge and ideas so as to keep all in touch with the development and the progress of the science and art of nursing;

To promote the spirit of co-operation for the good of the pro-

fession, and furnish opportunities for a nurse to assist her comrades;

To promote the effectiveness of the nursing profession and thereby to secure the support of the women of the country;

To enable the Siamese woman to show that she can form and maintain an institution for the good of a profession she has made her own and an institution that does honour to Siam.

The Association is governed by a strict constitution in which only women who possess a nursing certificate approved by the Council, are eligible to membership. The Council consists of eight councillors, namely, a President, a Secretary, a Treasurer, and five Executive Councillors. Professional conduct of members is carefully guarded.

The Association holds monthly meetings at which nurses and medical men lecture to the members on medical, surgical, public health, and hygiene and dietetic subjects. The yearly meetings are well attended by nurses from the provinces as well as those resident in Bangkok.

There is a committee which arranges to send nurses, members of the Association, to do private nursing among the homes of the people at the call of doctors.

There is also a committee for compiling and printing Text-books on nursing. The first set of books decided on included :—

1. Principles of and Procedure in Nursing;
2. Ethics; and
3. Dietetics; and these are all now being prepared.

Employment is found for members in various branches of the nursing field such as Public Health and Institutional work. The Association always learns where there is a vacancy and fills it with a member, accepting the responsibility for the appointment. For the sake of humanity, the Association undertakes the teaching of first aid among the Government schools, so that the teachers and scouts have a chance to learn practical work at first hand. First aid stations have been established at various times by the Association when a big concourse of people gathered together for fêtes and fairs.

The Association tries with fairly good success to get its mem-

bers in Bangkok to register with the Medical Council in conformity with the registration law. But the members residing in the provinces have not yet registered as the Law has not yet come into force outside Bangkok. The reserve fund of the Association is now Ticals 1,500 (equivalent to £145). The membership fee is Ticals 5.00 annually. All the members of the Association are either fully trained nurses or midwives. At date there are 292 active members. The Association hope to be able to join the International Council of Nurses at Geneva in the near future. In the short period of its existence the Association has made satisfactory progress and all the members have tried their best to help.

In presiding at the first annual meeting of the Nurses' Association of Siam, His Royal Highness the Vice-President of the Red Cross Society expressed hearty approval of the resolve to form the Association and trusted it would help to raise the status of womanhood in Siam. It was the duty of everyone, His Royal Highness said, to fend for himself, but the duty of mutual assistance was forced upon us in the case of the new-born infant, the sick and the aged. The work of caring for such helpless persons was pre-eminently that of women. But natural kindness was not enough for such work; a trained knowledge was also necessary.

After sketching the history of nursing, His Royal Highness asked the nurses present ever to bear in mind that they were not hired as servants to do certain work. They were trained for a profession; and the profession of the doctor and the nurse must be considered the highest of all. Other professional men and women worked for the income they received; the doctor and the nurse had duties which they must carry out apart from any question of payment. The Siamese doctors of olden days did not, he was sorry to say, have that conception of their duty. They would bargain for payment beforehand, which enabled them to avoid difficult cases. The Siamese doctors and nurses of to-day had the standards of all civilized nations, and in the case of the nurses the new Association should help not a little in maintaining these standards.

Chiengmai Leper Asylum : Men's Quarters.

CHAPTER XXIII

LEPROSY IN SIAM

The actual extent of the malady and the total number of lepers in the Kingdom is not known with any degree of accuracy. A census of the leper population taken some twelve years ago showed about seven thousand recorded cases. But like all attempts at making a leper census this one must have given very inaccurate results and the figure named evidently is much below the actual number of leper people.

The two chief reasons for inaccuracy in making a leper census are the census-taker's lack of knowledge regarding the disease and also and particularly the unwillingness of the leper and his friends to have him registered as a leper. Their passive resistance is usually very effective.

It is probable that in a population of more than eleven millions, Siam has approximately twenty thousand people infected with leprosy, many of these being incipient and unrecognized cases.

Chiengmai Leper Asylum

In October 1930, Chiengmai Leper Asylum closed its twenty second year. Its beginnings were small indeed.

Soon after entering upon his medical service in Chiengmai in January 1890, the writer* was deeply impressed with the dire need of the wandering leper. Appreciation of this need came about largely because of the frequent visits of leper people to the medical compound to beg for alms and for medicine. Finding that their requests met with response they came in increasing numbers and in increasing frequency so that during a period of several years not a day passed in which leper beggars, in companies of from two to a dozen or more persons, did not come for alms.

*James W. McKean, M. D.

Drawn by our effort to give a measure of relief, a company of more than fifty leper people made camp on an island in the river a mile below the city where food and medicines and other comforts were given out.

It became increasingly evident that sporadic efforts were wholly inadequate to meet the need of the many lepers of the region and that an organized work should be undertaken.

Perhaps the most important circumstance making possible the beginnings of the Asylum was that the writer during a period of some ten years, and until the time of the Chao's death, was physician to Chao Inta Wichai Yanon, the Ruling Chao of the Northern Provinces. When the eldest son of Chao Inta Wichai Yanon came of age, his father gave him a Good Luck present. This present was none other than a very large and very choice elephant. Whether this elephant brought good luck to his young master is not known, but he seems to have brought ill luck to others. He proved to be a very vicious creature. He killed his keepers and became too dangerous for use. His front legs were hobbled with a heavy chain and he was placed upon an island in the river some four miles below the city. He soon became master of the island and ruled his domain with great rigor. He destroyed the gardens of the island villagers. He tore down their granaries and even their houses to secure the food he wished. Finally the villagers fled and left him the sole occupant of the island until the time of his death.

The Chao owner of the elephant became ruler upon the death of his father. He also was the writer's patient during many succeeding years. Generous in a marked degree, upon request he made a personal gift of the island-home of the elephant to the writer to be used by the Mission in establishing a leper asylum. Following the death of the elephant this island had grown into a tangled jungle and in this condition was turned over to us. At a later date the Chao's gift was ratified by the Government.

The beginnings of the Asylum were auspicious only in the immensity of the task before us. With more than a hundred

acres of land overgrown with briars and thorns, with six or seven leper people anxious to take residence in the shade of the trees, with no funds in hand or in sight for the purchase of food and clothing, the outlook was not encouraging.

On making known to the public and to friends the needs of the leper, encouraging responses in gifts of money for maintenance were received in increasing numbers.

Nor were there wanting large hearted Siamese officials, men of real vision, who gave most valuable aid in meeting opposition. His Royal Highness Prince Damrong and Chao Phya Surasi, the High Commissioner for these Northern Provinces gave moral support and encouragement. To these two men in particular Siam is heavily indebted for fostering the beginnings of work for the many thousands of Siamese people who are suffering from leprosy.

From the inception of the Asylum until the present time one of the ideals to be attained and that has been kept constantly in view is to render the institution as home-like as possible. Barring the prohibition of marriage, the Asylum is in all respects a real community of four hundred persons whose activities move along the ordinary channels of community life.

To this end the Siamese form of local self-government with officials elected by themselves is in use and gives much satisfaction. A hospital and dispensary, a church, schools for men and women, a Siamese physician, a sanitary squad, uniformed home guards, a welfare committee, a community store and grocery market, blacksmith and carpenter shops, shop for making of cement roofing tile, tailor shops for the men and for the women, etc., give to this community the semblance of a well regulated village, rather than that of a hospital or "an abode of living death," as a leper asylum at times has been designated.

A force of twenty leper policemen, a part of whom are constantly on duty, gives protection from outsiders by day and night and helps to preserve order among our own leper people.

The daily tasks pertaining to the household and to the various activities indicated above involve, of course, a greater or less

degree of labor, labor being an integral part of a contented life.

Occupational therapy is highly esteemed in this institution and has proven to be one of our most valued therapeutic measures. Indeed so remarkable has been the improvement in scores of cases, that one is likely to incline to the opinion that in selected cases, the provisions of the Asylum which afford good food, good cheer, physical comfort, freedom from worry and a proper amount of physical labor are of paramount value in bringing about an arrested or negative phase of the disease; and that in such cases specific medication possibly is of minor value.

Gardening.

Gardening for leper people serves three very useful purposes. Time hangs heavy on the hands of these people who are voluntary exiles from home and friends. Tending a garden of one's very own relieves to some degree the tedium and monotony of asylum routine and gives a definite interest in life, together with the pleasurable anticipation of reward in gathering the fruits of the earth.

Again the degree of labor involved in gardening is not onerous and is of positive value in improving the condition of the patient and in hastening the day when he may hope to be called a negative case, with the prospect of being restored to home and society.

Observers of the disease agree in the opinion that the active leper patient makes much more satisfactory improvement than the indolent patient. The germ of leprosy in the human body has been likened to the Java weed in the water courses of Siam. This weed grows luxuriantly in stagnant or slowly moving water whereas in a swiftly flowing current it cannot thrive. The lepra bacillus thrives well in the body fluids of the lazy patient, but it finds poorer soil for growth in the body of the active, busy leper patient.

A third and very important benefit from gardening is the fruitage, in the form of vegetables and fruits, which supply the vitamines and salts that are so necessary and which act as marked adjuvants to the treatment by Chaulmoogra Oil and other remedies.

While a considerable proportion of leper patients are unable for work there are others who crave some form of activity and a productive activity such as gardening is of great value.

It would seem to be within the range of possibility that the colonization of leper people for gardening, fruit growing, stock raising and the production of paddy would be most useful in bringing a good degree of happiness to these unfortunate people and also help to ameliorate their terrible malady.

Support.

In the early days of the Asylum the support was entirely local, coming from foreign and Siamese friends in Chiengmai and vicinity. From before the days of the Asylum, when we were giving unorganized aid to the wandering leper, until the present time, Mr. D. F. Macfie, has solicited funds for the lepers each year during a period of more than a quarter of a century.

The British Mission to Lepers began to make grants-in-aid in 1909 and continued these grants for more than a decade. Later the American Mission to Lepers has been making annual grants. Indeed the major part of support both for buildings and maintenance has come from these two sources from the beginning until the present.

During several years His Siamese Majesty's Government made occasional grants on special occasions. In 1924 through the kind recommendation of the Siamese Red Cross Society, His Majesty's Government put the Asylum into the Budget for ten thousand Ticals (£910) per annum which amount we have received each year during seven years.

The total operating expense for the year 1929 was forty nine thousand Ticals (£4,455), the major items of expense being for food, clothing, medicines and attendance, for three hundred fifty (350) patients, an average of one hundred and ten Ticals (Tcs. 110) or ten Pounds per patient per year.

Equipment.

The present equipment in the matter of buildings is as follows:—

Dormitories, each accommodating sixteen to twenty persons (brick) 9

Wooden cottages for two persons each	84
Brick cottages „ „ „ „	32
Overseers house (wood)	1
Chapel, Injecting Clinic and Water Tower (brick)	3
Crematorium Chapel	1
Doctor's residence, Godown Office (wood)	2
Covered Bridge Building, used in part as a Government post office (wood)	1
Market Houses (wood)	2
Rice Granary and Milling Shed (wood)	1
Work shop and tool go-down (wood)	2
Administration Building and Community House (brick)	2
Well-houses (brick and wood)	3
Making the total number of buildings	143

Nearly all of these buildings have been donated to the Asylum as individual gifts. The one hundred and sixteen cottages are mostly built in memory of departed friends.

Treatment.

Anti-leprosy treatment consists in the injection of Chaulmoogra Oil, plain sterilized oil of *Hydnocarpus Anthelmintica*, twice each week. Treatment is not compulsory, but a large proportion of the patients, even many A2 cases, elect to take the injections continuously. More than fifty per cent. of the patients are under this form of treatment.

Alepol and Antileprol as well as Ethyl Esters have been used. Our definite choice is the plain oil. The many concurrent maladies to which leper people are subject receive, of course attention and treatment.

Each year a considerable number of patients, having made marked improvement, leave the Asylum believing themselves to be well or at least so nearly well that they will be accepted by family and friends. We have no control over these cases. Some of them return later with a new exacerbation of the disease. Others seem to remain negative and maintain a fair degree of health.

Chiengmai Leper Asylum : Treatment Building.

Chiengmai Leper Asylum : Women's Quarters.

Cultivation.

The whole area of asylum land, one hundred and sixty acres is under cultivation.

The door yards of all the dormitories and cottages are planted with flowers and fruit and flowering shrubs.

All the leper people, who are not too ill, are encouraged to make vegetable gardens. The more than twenty acres of gardens attest the interest of the patients in this pleasant and productive employment.

Bamboo is a much used article in the Asylum and is planted in fairly large quantities.

More than fifty cocoanut palms have recently come into bearing and several hundred more are coming on.

A mango, Lam Yai, Linchee and orange orchard is nearing the point of bearing fruit.

A garden of some three or four hundred cotton trees has begun to bear and soon we shall be able to produce cotton for our own mattresses.

Three varieties of Chaulmoogra bearing trees, the *Taraktogenos kurzii*, the *Hydnocarpus wightiana* and the *Hydnocarpus anthelmintica*, a total of more than one hundred, are progressing toward the fruiting stage. The great abundance of Chaulmoogra fruit produced in the jungles of Siam, however, renders the cultivation of these trees superfluous.

The whole area of low land, that is flooded at times and therefore unsuitable for gardens or for rice cultivation, is planted out to Rain trees and Mai Quao trees. These trees bring a considerable income from the production of sticklac. The branches are used for fuel, fuel of course being an important item, inasmuch as more than a hundred stoves are used each day for cooking meals.

Our limited but very encouraging experience, even in a contracted area, in the matter of gardening and other forms of cultivation, incline us strongly to the opinion that the colonization of leper people is not only practicable but highly desirable. With an area of well-watered land and a modicum of financial aid at the outset it is entirely probable that the great majority of

people afflicted with leprosy could become self-supporting, thereby freeing the public and the Government purse from the heavy burden of their support.

It is most interesting to note that a definite move is well under way in Siam for establishing two colonies for leper people, one in the South under the auspices of the Local Authorities and one in the North under the Department of Public Health.

Chiengmai Leper Asylum, from its earliest days until the present time, has enjoyed the confidence and the support of the public and also of the Royalty and Nobility of Siam. Their Majesties the King and Queen visited the Asylum in January 1927. His Majesty graciously spoke words of cheer and encouragement to the leper men. Following this visit His Majesty commanded the metaling of the road to the Asylum, at a cost of twenty-two thousand Ticals, the equivalent of two thousand Pounds.

The marked growth of interest in this great sanitary problem in Siam, especially the earnest attention given by His Majesty, by the Siamese Red Cross Society, by the Department of Public Health, by members of the Royalty, Nobility and official circles begets the hope that soon there will be devised a comprehensive scheme for dealing adequately with the whole matter of leprosy treatment and control, looking to the final extermination of the malady from the Kingdom.

Phra Pradaeng Leper Asylum.

For a long time it has been felt that steps should be taken to control leprosy in the capital. Previous to 1921 nothing had been done for the lepers or against leprosy in this large conglomeration of people. It was the pioneer work of Dr. James W. McKean in the North and the health conscience of the modern times that stimulated the Siamese Red Cross to initiate anti-leprosy work in this city.

A public subscription for the Red Cross Leper Asylum was opened at the Winter Fair in 1921. Over 100,000 Ticals was collected in a few days. The Government granted a piece

Phra Pradaeng Leper Asylum: Administration Building.

Phra Pradaeng Leper Asylum: Men's Quarters.

of land at the ruins of an old fort. The land was selected for its propinquity to the town, yet isolated from the latter by the Menam Chao Phya.

The earthwork was started at once. The construction of the nucleus was completed in May 1923; then the capacity of the Asylum was 125 beds. A few more buildings were added, and the accommodation is now 200 beds. The capacity may be however considerably increased in the future.

At present there are altogether 30 buildings, namely, an administration building, a hospital and treatment building, 3 large men's wards, 2 children's wards, 19 cottages and 4 service buildings. The women's quarters are separated from those of the men by walls of the old fort.

There is sufficient free space for gardening, animal husbandry and sports. The Asylum is provided with a school, a library and other facilities for recreation. Those who are strong enough are usually employed by the Administration on work according to their skill.

The clerical staff is supervised by a superintendent who is directly under the chief of the Anti-Leprosy Division. The total operating expense for the year 1929 was Ticals 32,000; an average of one hundred and sixty Ticals or 15 Pounds sterling per head.

The physician and his nursing staff live near the compound. Besides the routine work he supervises the sanitation, instructs the inmates in personal hygiene and conducts to a certain extent research work with regard to the methods of treatment, especially in connection with dietetic factors.

The aim of this institution is to segregate and to treat those lepers who have no home of their own or whom the medical officers consider undesirable to stay at home. Children are willingly accepted. The institution is conducted on the principle of voluntary segregation, as complete isolation is not believed to be practicable and might be even harmful at the present stage of the campaign.

Nakon Leper Home.

The work for lepers in Nakon Sridharmaraj was begun by Dr. E. B. McDaniel as a small out-door clinic in 1922. The attendance has increased slowly but steadily. Inasmuch as many patients come from a distance, it has been found necessary to provide shelter, residence and support for these, and this has resulted in the formation of the Nakon Leper Home with some seventy-five in-patients.

There are now ten buildings with a good area of land. Generous contributions have been received from many individuals and business firms. His Majesty's Government has donated an additional area of twenty five acres of land that is suitable for growing fruit and vegetables. With a probable leper population of two to three thousand in this area, the need for expansion and for adequate support is apparent and there is good prospect of growth into an institution of great value to the community.

CHAPTER XXIV

THE KING CHULALONGKORN MEMORIAL HOSPITAL

The Red Cross Society having been founded (1893), the honorary members of the Committee began to look for permanency in the form of a hospital, but the interest faded down into partial negligence until the demise of H. M. King Chulalongkorn, when the members of the Royal family, under the lead of H. M. King Rama VI., inaugurated a fund for the erection of a Red Cross hospital by donating 122,910 Ticals. Everybody began to follow suit.

Foundation of the King Chulalongkorn Memorial Hospital was laid on June 28th, 1911. One administrative building, two wards of 22 beds each, and two operating theatres were built, totally of ferro-concrete. Dr. F. Schaefer, late adviser to the Military Medical Department, was made director of the Hospital, and it was largely due to him that the present Hospital was so well planned, with the various blocks spaced out and the interior well equipped on modern lines, to the admiration of visitors, lay and medical.

Unfortunately, Dr. F. Schaefer died suddenly of blood poisoning a fortnight before the date fixed for the formal opening of the Hospital. Major-General Phya Vibul Ayuraved (then Luang Sakda Bolaraksha) was promptly put in charge and remained in office for three years, at the end of which he was transferred to the head of the Military Medical Department and was succeeded by Major-General Phya Damrong Baedyagun, the present director.

May 30th, 1914, the first Red Cross hospital in Siam was opened with all due ceremony by His Majesty King Rama VI. The inaugural address made by the Minister of War clearly stated the object of the Hospital: "To EXAMINE AND TREAT ALL SUFFERERS REGARDLESS OF RACIAL DIFFERENCES."

Contributions and special funds dedicated to new wards

rapidly followed. In the meantime patients clamoured for admittance, and it at once became necessary to improvise temporary housings for them, while new blocks were being added from year to year. These were donations of individuals in memory of some dear ones. The following wards came into being in the order stated:

1916. Panjama Rajini Ward, for general female medical cases (23 free and 10 paying beds).

1917. Vajiravudh Ward, for general male medical cases, (23 free and 10 paying beds).

Chirapravati Ward, general surgical male (22 free beds).

1923. Lim See Lun Ward, general surgical men (21 free and 15 paying beds).

Singha Seni Ward, for male eye cases (10 free beds).

Vajirayarna Ward, medical, specially for priests (8 free beds).

1925. Ratana Sangwalaya Ward, for ear, nose and throat male cases (10 free beds).

Kao Asawanandha Ward, female eye cases (10 free beds).

1926. Posayanandha Ward, for ear, nose and throat female cases (10 free beds).

Malini Ward, for infants (42 free beds).

Yomaraj Ward No. 1, lying-in (20 free beds).

Yomaraj Ward No. 2, lying-in (20 free and 4 paying beds).

1927. Sai Yud Ward, surgical, specially for priests (10 free beds).

1930. Athorn Ward, female, gynaecological (above) and general surgical (below), (45 free beds).

Paibhul Ward, eye, ear, nose and throat cases, for priests (10 free beds).

Of the total 365 beds 325 are free.

Other buildings: Chakrabongse Out-patient, with various special sections, accommodating 200 people with ease.

Sudhadibya Nursing School and quarters for 60 students.

Accommodation for the Director and Resident Staff.

Endowment beds.

There are now 323 beds, 243 of which have been endowed at

The King Chulalongkorn Memorial Hospital : Administration Building.

from 3,000 to 6,000 Ticals per bed. This sum is estimated to bear an interest which will keep one patient, the average cost for one patient being 0.50 Tical per day.

Paying patients.

40 beds (in rooms of one and two beds) are allotted to paying patients at 6 and 3 Ticals per day inclusive of meals and medicine. A medical case pays no treatment fee, but a surgical case pays from 50 to 200 Ticals for a major operation, or 20 Ticals for a minor operation; and a lying-in patient pays 40 Ticals for attendance on labour. Members of the Red Cross Society are charged at half the price.

The Hospital ground.

The Hospital is situated on about 200,000 square metres of land in an outskirt of the metropolis. Though ten years ago this was rather a desolate place, now it is a busy part and within easy reach by tram and omnibus, owing to rapid extension of the city in this direction. The land is connected with the Royal Bangkok Sports Club ground behind, an open park on the left, and the Saovabha Institute on the right, all of which are no hindrance to the inrush of pure country air. This piece of land has been leased from the Royal Privy Purse since 1911 at a nominal sum.

Medical Officers.

The first thing that strikes one visiting this Hospital is the appearance of men in military uniform, and one wonders at the association of anything military with the Red Cross. As a matter of fact, the Hospital was at the commencement under the direct supervision of the Chief of the General Staff who acted as the Directing Vice-president of the Red Cross Society, for the Red Cross Society was unable to meet the running expenses and the salaries of the medical officers. The Ministry of War thereupon sent some officers from its Medical Department to man the Hospital. But in 1916 the Red Cross Society took back the administration of the Hospital, though the military men remained. They, however, were gradually withdrawn and new medical men under the pay of the Red Cross Society put in their places. The few military medical officers remaining at

the present time have been lent by the War Office to serve directly under the Red Cross Society.

There are at the present time 23 medical officers amongst which number are 3 surgeons, 3 physicians, 2 gynaecologists, 2 ear-nose-and-throat specialists, 2 ophthalmic surgeons and 3 dentists, each of whom has one or two assistants. Beside these are 2 consulting surgeons, 3 consulting physicians, 2 consulting obstetricians and gynaecologists, and 1 consulting dentist.

Work of the Hospital.

To the Siamese people modern medicine had never been popular. They had had always a fear of being "cut up" or something done to them against their will while in hospital; and at the outset it was doubted if anyone would come to hospital at all. But the result of treatment was so far superior to the old Siamese method that people began to seek admittance, and it needed a great exertion on the part of the Red Cross Society to advertise for funds necessary for the rapid extension of the wards. Perhaps in no other country has the response been so well given, and it stands to-day a credit to the Nation that the Hospital shows up as it does, one of the finest and most up-to-date in the Far East.

Medical work is carried on very much on the same lines as in Europe and America, thanks to the Red Cross Society's action in sending out men to England and America to bring back medical knowledge from time to time both as under-graduates in universities and as post-graduates by special arrangement. Besides our men always keep in touch with British and American methods through various medical literatures, thanks to their knowledge in the English language, a compulsory subject in all Government schools.

An abstract of some common diseases treated in this Hospital may be of interest. Visitors come here fully expecting to find rich examples of tropical diseases, but they are doomed to disappointment. Though situated in the tropical zone, Siam harbours few really tropical diseases. One finds no yellow fever or sleeping sickness of Central Africa, no bilharziasis or relapsing fever of Egypt, Kala-azar of India, nor the oriental sore of North Africa.

A disease is tropical in virtue of the transmitting agents which exist only in the tropics. Thus here we find endemic the following :—

(1) *Malaria* in its three varieties. The tertian is uppermost in Bangkok and everywhere, the subtertian is found commonly enough in the northern provinces with and without the sequela of Blackwater fever, while the quartan variety is sparse all through the country. Natives have good resistance to malarial infection, getting only mild attacks which are however difficult to get rid of altogether. Seven days administrations of plasmochin compound (1 grain plasmochin and 7 grains quinine a day) have brought cure to most cases found in the army.

(2) *Beri-beri*, prevalent but decreasing in severity. Occasional outbreaks amongst troops have been quelled by the substitution of unpolished rice and the allowance of more generous fish and vegetable food. Cases admitted into this Hospital are of the chronic peripheral neuritic type which does not yield to treatment. Acute peripheral neuritis is occasionally seen after labour, but disappears readily under treatment. The cardiac type is probably rare everywhere save as a concomitant lesion towards the final stage of the disease.

(3) *Yaws* ravages in many provinces. It is conveyed from person to person by flies alighting on exposed sores of the infected and by infected drinking cups. Treatment with three weekly injections of 0.3 gramme neosalvarsan is the rule.

(4) *Amoebic dysentery.* One may state with fair accuracy that nearly every Siamese has been affected at least once by this infection; so much so that it is nothing unusual to find amoebic dysentery cropping up during some other illness in a patient whose vitality is for the moment below par. Treatment with Emetine followed by 0.5 gramme doses twice a day, of stovarsol is as a rule successful.

(5) *Leprosy.* No case is admitted but is sent to the Red Cross Leper Asylum down the river through the agency of the Health Section.

(6) *Hookworm infection* is prevalent in many provinces

especially in the Lao provinces of the North and North-East. When it is found during the routine examination of faeces, chenopodium or thymol given at one drop (a grain) per year up to twenty, twice, at an interval of 3–4 days.

Epidemics of Plague, Cholera, and Bacillary Dysentery have appeared from time to time especially during the dry hot season, but of late years they seem to have subdued, thanks to the assiduity of the Government Public Health Department. Such cases are not admitted but are at once removed to the Infectious Diseases Hospital on the west bank of the river. Anti-cholera vaccines were inoculated free of charge to out-patients during past epidemics.

Cases of filarial diseases, viz: guinea-worm infection, elephantiasis and filaria loa infection, are met with but very rarely in this country. Only few cases have been seen in hospital. One case of mycetoma of the foot and two cases of trematode infection of the liver have been met with.

Experience and Research Work.

Facilities are given to research workers by helping them with material and apparatus and allowing the use of the rooms of the pathological department. Experience we have had little, but we have stored up some observations: for instance, most cases of acute appendicitis are found really amoebic in origin and do better with emetine than an operation which is dangerous owing to the flaring-up of amoebae hystoliticae. All cases of bladder stone are operated on through the suprapubic route, supplemented in advanced cases with deteriorated kidneys with thorough drainage. A few cases with stone stuck in a pocket at the base of the bladder have been operated upon through the perineum. About 60 lithotomy have been performed annually. No crushing operation could be employed owing to the large size and hardness of stone. For anaesthesia stovaine is most suitable.

Prolonged administration of ether was found dangerous due to rapid evaporation through the bronchioles, and patients often died of severe bronchitis. The method has therefore been discarded. Administration of short closed ether, however, is most convenient and safe for minor operations lasting within five minu-

The Out-patient Department of the Chulalongkorn Hospital.

tes. Otherwise chloroform is the anaesthetic generally employed.

The first Caesarean section was performed in this Hospital fifteen years ago, and on the gynaecological side we have the largest ovarian cysts in our museum. The only child in the world born outside the womb is actually living in this Hospital, now nine years of age. Lastly, much experience has been gained from cases of accidents and injuries, especially of emergency operations on the skull, chest and abdomen.

Within recent years attention has been given specially to prophylaxis and treatment of tetanus which abounds in Bangkok. It is a rule of the Hospital that every wound contaminated with earth must receive at once a subcutaneous injection of anti-tetanus serum (1500 U. S. A. units). We have been giving only one dose and found it sufficient to prevent lock-jaw. Out of 566 cases so treated from August 1927 to August 1930, not a single one came back with symptoms of tetanus, whilst two cases—one of a stab wound, the other a large chronic ulcer which had been poulticed with certain dirty Chinese medicinal leaves—admitted into hospital but by some oversight no prophylactic serum was given, both died of acute tetanus. Every old accident wound when to be reopened receives the same amount of serum 24-48 hours before or during operation.

Even with all these precautions, we admitted into Hospital an average of nine cases of tetanus a year (between 1919 and 1929). All the surgeons here agree that the result of treatment with daily intrathecal injections of serum (9,000-12,000 U. S. A. units) is uncertain, and that one may hope for a cure only in very mild cases. Recently experimental treatment with intrathecal carbolic acid (1 in 400 normal saline) has given very good results: 15-20 c. cm. in a child of twelve and 30-40 c. cm. in adults, once only. Out of 9 cases so far treated 3 died which were children of 6, 12 and 13 years of age; the first showing symptoms of tetanus 12 days after operation for bladder stone and post-mortem examination revealed suppuration of both kidneys with dilated calyces, the second and third cases were in extremis with clenched teeth and successive spasms. More cases, however, are awaited

before the method can be published without causing scruple on the part of the general medical body.

Research work on cancer is being started, but it needs a strong stimulus to rouse the capitalists to the necessity of financial assistance. Intravenous injections of lead acetate have been tried, and when combined with surgical removal or subsequent treatment with radium have given a few encouraging results, particularly in epithelioma of lip and carcinoma of breast.

The Hospital as a practical school.

Post-graduates of the King Chulalongkorn University and officers of the Military Medical Department are received as house surgeons, physicians, obstetric, etc., for a period of six months. There is no medical school attached to the Hospital.

The Nursing School.

A nursing school under the supervision of the Relief Section of the Red Cross Society is attached to the Hospital. A three years course is advocated, comprising of class lectures and practical demonstrations in general nursing, midwifery and childwelfare.

Examinations are held at the end of each year. After having passed the third year the student obtains a certificate as a nurse. If she wishes to be a certified midwife, she must continue 6 months more in the lying-in ward.

In-patient list of common diseases treated in KING CHULALONGKORN MEMORIAL HOSPITAL for the year 1928.

DISEASE	Total	Cured	Better	Unchanged	Worse	Dead	REMARK
Medical							
Typhoid	87	36	8	7	—	36	
Para-typhoid	1	1	—	—	—	—	
Amoebic dysentery	56	17	16	2	—	21	High no. of deaths due to patients coming late.
Acute colitis	49	22	10	5	—	12	Death mostly in infants.

DISEASE	Total	Cured	Better	Unchanged	Worse	Dead	REMARK
Cirrhosis of Liver	24	2	6	5	—	11	
Acute bronchitis	18	10	5	—	—	3	
Lobar pneumonia	56	25	7	4	1	19	Some cases influenzal.
T. B. lung	17	—	8	3	—	6	
Broncho-pneumonia (infants)	14	7	1	—	—	6	
Malaria (Tertian & Quartan)	103	87	11	5	—	—	
Malaria (Subtertian)	8	—	—	—	—	8	Late cerebral cases
Beri-beri	12	3	7	—	—	2	
Acute nephritis	30	6	12	7	—	5	
Locomotor ataxia	2	—	2	—	—	—	
Hemiplegia	20	3	14	—	—	3	
Cerebral haemorrhage	4	—	—	—	—	4	
Pellagra	3	—	1	1	—	1	
Surgical							
Bladder stone	68	18	—	14*	—	6	*Refused op.
Inguinal hernia	52	46	—	6*	—	—	*Recurred.
Wounds: Incised	55	52	—	2	—	—	
Gunshot	38	35	—	1	—	2	
Puerperal Sapraemia	10	8	—	—	—	2	
,, Septicaemia	4	1	—	—	—	3	
Acute salpingitis	11	8	3	—	—	—	
Toxaemia of pregnancy	5	3	—	2	—	—	
Eye						—	
Trachoma	38	37	—	1	—	—	Early cases.
Cataract	14	13	—	1	—	—	

DISEASE	Total	Cured	Better	Unchanged	Worse	Dead	REMARK
Corneal ulcer	9	8	—	1	—	—	
Gonococcal conjunctivitis	10	10	—	—	—	—	
Pterygium	10	10	—	—	—	—	
Ear, Nose & Throat.							
Enlarged tonsils	39	38	—	1	—	—	
Chronic ethmoiditis	33	33	—	—	—	—	
Acute ethmoiditis	9	8	—	1	—	—	
Suppurative ethmoiditis	3	3	—	—	—	—	
Mastoid abscess	12	12	—	—	—	—	
Deflected septum	15	15	—	—	—	—	
Nasal polypi	17	17	—	—	—	—	
Hypertrophy of turbinate	12	11	—	1	—	—	
Diphtheria	5	1	—	1	—	3	Found in children only.
Fractures: Close	26	22	—	4	—	—	
Open	13	10	—	1	—	2	
Non-malignant Growths	21	21	—	—	—	—	
Cysts	8	8			—	—	
Carcinomata	27	—	—	27	—	—	
Epitheliomata of lip and cheek	15	10*		4	—	1	*Result uncertain.
Sarcomata	22	..	..	..	..	..	
Carbuncle	24	23	—	—	—	1	
Acute appendicitis	10	9	—	—	—	1	
Tetanus	19	9	—	—	—	10	
Obstetrical							
Normal labours	399	399	—	—	—	—	

DISEASE	Total	Cured	Better	Unchanged	Worse	Dead	REMARK
Labour complicated by amoebic dysentery	3					3	
Placenta praevia	7	3	—	—	—	4*	*Late cases.
Gynaecological							
Abortions	22	22	—	—	—	—	
Bartholin gland abcess	19	19	—	—	—	—	
Cancer of cervix uteri	11	..	—	—	—	—	Recurrence probable, being advanced cases.
Cancer of lady	2	..	—	—	—	—	
Endometritis	40	25	15	—	—	—	
Fibroid uteri	11	11	—	—	—	—	Hysterectomy.
Ovarian cysts	26	26	—	—	—	—	

CHAPTER XXV

OTHER INSTITUTIONS

Siriraj Hospital.

This hospital is on the west bank of the river that flows through Bangkok, being in the Wang Lang district of Thonburi. It had its inception in temporary hospitals established during an epidemic of cholera in the year 1881 (B.E. 2424). It was named by H. M. King Chulalongkorn in memory of a son, H.R.H. Prince Siriraj, and was formally opened on April 26, 1888.

In 1889 the first instruction in medicine in Siam began in this hospital and in it in 1896 the first instruction in Midwifery and Nursing in this country began as the School of Midwifery and Nursing founded by H. M. Queen Saovabha.

For many years the hospital buildings were of wood but they are now being replaced by structures of brick and concrete. The "unit" of construction is a two-story building, 44 by 11 metres. Five of these units are already built and another for private patients will be added. Depending upon the interior arrangement, those used for wards accommodate from 48 to 55 patients each. Smaller buildings are to house children, Men's and Women's venereal, and cases of cholera, typhoid and dysentery.

The obstetric service of the hospital is a large and increasing one, attendance being encouraged in order to provide cases for the students of medicine and for the pupils of nursing, each of the latter when graduated being a qualified midwife as well as nurse. About 700 deliveries occur yearly. The two buildings for the Department of Obstetrics and Gynecology are connected by a two-story corridor. They have separate sections for clean obstetric patients and for infected ones (a delivery room for each), for gynecologic patients and for waiting maternity patients, some

Siriraj Hospital: Men's Medical Ward.

fifteen of the last-named furnishing subjects for antenatal examination and care.

The surgical service is also large and a surgical building contains two operating theatres. It also has a lecture room and an X-ray plant. The latter includes a vertical fluoroscope and a cassette changer that permits the taking of stereoscopic radiograms of the chest. More than 200 patients a month are now handled in the X-ray department.

When the building programme is completed, Siriraj Hospital will accommodate 300 patients. It is used chiefly for persons suffering from acute diseases, though surgical tuberculosis furnishes a number of cases.

In-patients range from 3,300 to 3,500 yearly. The out-patient department has 40,000 visits a year, of which about 12,000 are new cases. All these are utilized for the teaching of medical students.

The nursing of the patients is looked after by some fifty graduate nurses and one hundred pupils of the School of Midwifery and Nursing connected with the hospital.

Six members of each class graduated from the medical school serve for one year in the hospital as House Officers, two in each of the three clinical departments.

St. Louis General Hospital.

The foundation of the St. Louis Hospital was due to the initiative of His Lordship Bishop Vey. He came to this country in 1865 and in 1875 was appointed Vicar Apostolic; a zealous missionary, with a heart full of sympathy for the welfare of the people, he soon realized the necessity of providing for educational establishments and other works of charity for the needy. The European community was fast growing and he felt the great need of an institution for the use of the sick.

Unfortunately lack of funds greatly hampered this worthy project and work was started only in 1896. The complete material organization of the hospital was a matter of no small difficulty but at last success was achieved. The Sisters of St. Paul de Chartres accepted the direction of the new establishment which was opened on the 15th September 1898, in the presence of a large gathering.

At first 7 French Sisters were attached to the different sections; they are now 9.

This Hospital receives any persons suffering from non-contagious diseases, of whatever nationality or creed they may be.

All qualified practitioners are allowed to send their patients to this Hospital and attend to them there. Further a doctor appointed and paid by the Catholic Mission is daily in attendance upon those patients who have no private doctors.

They are different classes with variable rates to suit particular needs. About a hundred poor patients are admitted gratis yearly.

The Hospital as well as the ground, and all dependencies are the property of the Catholic Mission of Bangkok who provide the management and see to the balancing of the yearly accounts.

We are glad to record here the fact that the Hospital has often benefited by donations made by Their Majesties, the Nobility, and the Siamese Government, as well as by several European firms in Bangkok or by private individuals.

Since its opening, many changes and additions have been made to the St. Louis Hospital. New wards have been built and the old ones adapted to modern standards.

We will only mention the purchase in 1927 of 40 milligrammes of Radium the importance of which is patent to all, and the erection in 1930 of an X-ray plant which has already proved its great utility.

It may be permitted to add that since its foundation in 1898 the St. Louis Hospital has rendered very valuable services to this country. The Catholic Mission in creating and financing this charitable Institution are fully aware that they not only further

St. Louis Hospital : Central Building for Patients.

St. Louis Hospital : The Nursery.

the welfare of the people of this country but also add their humble share to the great ideal of solidarity which governs mankind.

Number of Patients and Days.

Year	Patients	Days	Year	Patients	Days
1898	56	763	1914	186	2781
1899	143	2349	1915	259	2723
1900	200	2253	1916	212	3485
1901	163	1883	1917	314	2996
1902	189	2793	1918	277	3977
1903	145	2909	1919	290	2959
1904	245	1990	1920	277	3425
1905	270	3685	1921	238	2962
1906	261	4438	1922	276	2628
1907	200	4202	1923	220	2661
1908	405	3514	1924	220	2844
1909	206	3057	1925	224	2895
1910	273	3149	1926	225	2576
1911	271	4007	1927	256	2694
1912	289	4065	1928	258	3656
1913	236	4178	1929	277	3455

The Bangkok Nursing Home.

The Bangkok Nursing Home as an example of a comfortable and a successfully maintained Home, primarily for members of the foreign community, is worthy of interest.

Its history dates from 1897, but the present site was not acquired until 1902, and the new wing was completed in 1929. It is staffed by a Matron, and four English sisters. There is no resident medical superintendent. Treatment is ordered by the patient's own doctor.

In its early years its life was rather precarious, and, being entirely dependent upon the voluntary contributions of residents, at times it has been in danger of expiring. We read in the

minutes that on Aug. 26th 1901 a General Meeting was held to consider the advisability of liquidation, but the situation was saved by Mr. Michael Halliday, of the Arracan Company, who conceived the idea of a Home, run on regular monthly subscriptions, a system which, with some modifications, has continued since.

The Home owes much to those residents who, by their efforts in the early days, kept it going. We have also reason to be very grateful to the Royal Family. His late Majesty King Vajiravudh took a great interest in its activities, an interest which he manifested in a very material way by a liberal donation at a time, when owing to the war financial support was much needed. The Maternity Block, which was built in 1912, as a memorial to King Chulalongkorn, with funds raised among the European community, was also furnished by a generous gift from the late King. Our thanks should also be recorded to the many individual subscribers and firms, who gave liberally to the three separate appeals, which have been launched for the original building, and its extensions. It will be realized that an institution of this kind, which is not run for profit, cannot lay aside funds for future development, and any extension or additional accommodation is dependent always on the support and generosity of the community.

As it now stands the Home consists of a new block, containing Matron's office, lounge, stores, etc. on the ground floor, with above, private wards for six patients, each having a separate verandah, four bathrooms, two specimen and wash up rooms, pantry with food lift, bedding store room, and duty room. Connected with this wing by passages are an operating block, consisting of Theatre, Sterilizing room, Anaesthetic room, and X-ray room, and a Maternity Block of three private wards, complete with bathrooms. Labour Theatre, and Nursery. The old building has been reconstructed and provides accommodation for the Nursing Staff, each sister having her own bed-sitting room, with private verandah and bathroom while there is also a large social room and mosquito-proof room for common use. Downstairs are a sisters' dining room,

The Bangkok Nursing Home : Main Building and Maternity Block (in distance).

Matron's private sitting room, and a special sleeping room for the night nurse of the week. Separate buildings in the compound consist of servants quarters, patients' kitchen, staff's kitchen laundry, mortuary, etc.

The constitution, control, and upkeep of the institution is of interest. The land, buildings, and other assets are the property of the Home, represented by a body of subscribers, who delegate control to a Committee. This Committee is responsible for the maintenance, but all questions of major policy are put up to a General Meeting which is in any case convened annually.

In a General Meeting each subscriber and each subscribing firm has a vote. The upkeep is by monthly subscriptions, of Ticals 5 –, or annual subscriptions of Ticals 60/–, Family subscriptions of Ticals 7/– monthly, or Tcs. 80/– annually, are allowed, and business firms are permitted to subscribe for their European employees at a reduced rate.

In return for the above contributions, subscribers are entitled to the use of a room with board and nursing, for Ticals 6/– per diem. Non-subscribers are allowed the same accommodation, if available, at the rate of Ticals 20/– per diem. This rate appears high, but it is right that it should be so, as we wish to encourage subscribers, and with our high overhead expenses the above charge is actually less than the cost of upkeep per patient per day. It is found that the monthly subscriptions cover about 65% of the expenditure, the rest and a small profit is made from the daily charges to patients and sundry donations. There are no endowments.

The steady increase in number of subscribers, and their varied nationality, testifies to the usefulness of the Home to all sections of the foreign community. Residents look upon it as a form of insurance, the small subscription, payable by banker's order, is not noticed and when sickness comes, they have the benefit of a well equipped Nursing Home, where they can be attended by their own doctor.

McCormick Hospital.

The earliest contact of Northern Siam with Western Medicine was sixty-three years ago when the Rev. Dr. McGilvary, a missionary, treated a fever patient with quinine and the patient had to be hired to take the medicine. The treatment had the desired effect and the use of quinine spread until now hundreds of thousands of tablets are sold or dispensed annually. While malaria is still very prevalent in this district yet the use of quinine has been of distinct service. A village, for instance, that had a spleen index of 96 twenty years ago was re-examined this year and the index was 26.

While the Rev. Dr. McGilvary treated fevers and started vaccination for small-pox, the real beginning of the medical work of the American Presbyterian Mission in Chiengmai which has eventuated in the McCormick Hospital, was the coming of C. W. Vrooman, M. D., in 1872. He and his immediate successors stayed for short periods only, on account of ill health.

In 1889 James W. McKean, M. D., who is still on the field, arrived. He is responsible for the Leper Asylum mentioned elsewhere, and built the first permanent hospital building and the first operating room, operations having been done, up to that time, on the verandah of the dispensary building. He also established a laboratory for the preparation of small-pox virus and sent out from one to two hundred vaccinators over a period of ten years and thus not only practically wiped out small-pox in this district but greatly helped to popularize other and subsequent Public Health measures.

Though the old hospital plant had been gradually improved through the years, it was in reality more of an Inn to which patients were brought to be within reach of the doctor as most of the nursing and feeding care of the patient was done by his relatives, and it was not until the opening of the new McCormick Hospital in 1925 that we were able to assume the entire care of the patient.

Funds were contributed by Mrs. McCormick of Chicago and others, especially friends in Chiengmai, and the present plant has

McCormick Hospital: Children's Ward.

McCormick Hospital: Electric Light Plant and Laundry.

gradually emerged. The corner stone of the first building was laid in 1920 by H. R. H. Prince Adisara Udomdej, and in 1925 the hospital was formally opened by H. R. H. Prince Mahidol of Songkhla, four buildings being ready for use.

The present plant consists of seven brick and cement or ferro-concrete buildings as follows:—

1. A two-story ward building with four sixteen-bed wards, connected by corridors and ramp.

2. Surgical building with two operating rooms, cystoscopic room, sterilizing and preparation rooms, etc.

3. Maternity ward, the gift of Luang Anusarn Soontan and his wife, containing ward, delivery rooms, nursery, etc.

4. Administration Building, a two-story building providing for the administrative offices, out-patient clinic, X-ray rooms, room for Ultra-violet light therapy, diathermy, etc. This building is a memorial to the Na Chiengmai family and was built by Phra Rajchaya Chao Dara Rasmi, the Chao Luang of Chiengmai and other members of the family. The corner stone of this building was laid by Her Majesty the Queen Aunt and the building was formally opened by H. R. H. the Prince of Nagor Svarga.

5. A two-story private ward building, the gift of the British teak timber firms working in the North.

6. Kitchen and dining room building, the gift of the First Church of Chiengmai.

7. Superintendent's House.

In addition to these there is a small ward for Buddhist priests, the gift of Luang Anusarn Soontan; a power house which contains the electric light plant and the steam laundry of four units, in addition to Diesel engine and boiler, and also a Rest House for the accommodation of relatives since our patients come from many provinces as well as from distant villages in this province.

Perhaps the most significant development in the progress of the hospital was the establishment of a Nurses Training School in 1924. The school has a three years course for girls who have finished the Sixth Standard of the Government course of study, and is affiliated with the Siamese Red Cross Society, the graduates

taking the Red Cross Nurses' examination and receiving their certificate on passing.

The Superintendent and Assistant Superintendent of the Training School are American, the Supervisor is a graduate of the Peking Union Medical College Training School, and in addition we have four graduate nurses and fifteen student nurses.

The Medical Staff has five Americans, four doctors and a dietician, and three Siamese.

Last year a total of 1,187 in-patients were treated and 6,175 out-patients. 284 operations were performed under general anaesthesia and 311 under local (including caudal), some of these being hernioplasties, suprapubic cystotomies, etc.

Medically the diseases furnishing the largest number of hospital cases were Protozoan, malaria being first and amoebiasis, including dysentery, hepatitis, abscess, etc., being second.

In Surgery, urinary calculus furnished the largest number of operations with appendicitis, including abcesses and peritonitis of appendiceal origin, second.

A large majority of all patients harbour intestinal parasites, some having as many as four or five varieties. Infestation with Ascaris is of very great importance especially among children. Infestation with Hookworm is, on the other hand, usually light and only rarely of major importance.

The Hospital makes a major feature of Dietetics, the diet of each patient being prescribed. To assist in furnishing the required diet, we maintain a goat dairy, chicken farm and gardens.

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